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JOURNAL OF EDUCATIONAL RESEARCH

Official Organ of the Educational Research Association

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JOURNAL *of* EDUCATIONAL RESEARCH

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CAN OBSERVATION BE TRAINED IN SCHOOL CHILDREN?

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I. THE PROBLEM STATED

"TRAINING the faculty of observation" is a phrase which has long been used by didactic educationists and repeated by teachers. Some of the latter, indeed, when inquiry has discovered that their pupils did not perceive and remember the things they were required to know, for example, the reading and spelling of words, used commonly to reply, "No, but I am training the observation of the children generally; when that is done they will soon pick up the shapes and sounds of words." This attitude is now generally condemned.

Psychologists do not now believe in the training of memory, apart from the memorizing of what is useful, in the practical sense, or beautiful, in the aesthetic sense. They are not unanimous in this opinion, it is true, but many of them—perhaps the majority—would regard the transfer or spread of training as limited to common elements of matter or method which do not include the functional activity of remembering. Much criticism of a destructive kind has also been directed against the pedagogical doctrine involved in the phrase "training the observation."

It has been pointed out—I have done it myself—that observation must be limited and concentrated if we are to learn what we are required to know; the child who sees and hears everything is always, as it were, on the jump, he gets nowhere because he goes, or tries to go, everywhere. The specialist limits his observation within certain fields of inquiry, and thereby becomes an expert. He frequently inhibits successfully the contributions from other aspects (than his own) of the world of knowledge to such an extent that common sense calls him narrow and uneducated, as he often is. So the phrase "training the observation" becomes discredited. Curiously, though the phrase is out of fashion—a study of the fashions in education

would be a delightful and instructive topic for a lighter and more agile pen than mine—the thing itself has worked its way back again, in what is almost certainly a much less defensible form, namely, as "sensory training." To this phrase those in the height of fashion a few years ago used to add "motor training," as though one could cultivate dexterity generally without learning to do anything in particular. The teacher gives way, at least in theory, but holds in his heart that there *is* something real behind all these old phrases.

Much of the difficulty, not all of it, arises from the fact that psychologists and teachers are not using the words in the same senses. The psychologist knows what he means by sensation: he means the awareness of sense-impression, whether specialized or diffused sensorily. He knows what he means by perception: he means the identification or location in an objective way of his sensations, and he does not use the term observation at all. He knows what he means by memory: he means such retentions of past sensations or perceptions as, consciously or unconsciously, influence his present mental life. Whether these memories are, or are not, assisted by imagery of various types is a disputed point and need not detain us here. He knows what he means; he means retention, recall, and reproduction, and those synthesized and purposive reproductions, or rather productions, in which the original elements, though unrecognizable as elements—except perhaps by close and accurate introspective analysis—are vastly important for mental advance. The psychologist knows what he means by sensory training: he means the actual improvement by controlled practice of the acuity of some sense organ. A person sensorily trained—if such training is possible—is one who sees better, hears better, or distinguishes more acutely in a tactile or other sense. The psychologist can give many instances of experiments carefully conducted, in which, working mostly with adults, it is true, he can show that the actual acuity of the senses is found to be little affected by training, if at all. On a line of argument tending to a similar conclusion, it is questioned how far the acuter discriminations of sense which such systems as those of Montessori, for example, set out to obtain, are necessary or desirable. Why should we endeavor to discriminate, it is said, "umpteen" tones, shades, or tints of blue? And so sensory training may also go by the board, and become unfashionable among the élite who are up-to-date.

The teacher, however, is not convinced; he does not mean what the psychologist means. He talks of observation, not perception,

and by sensory training he means much more than an increase in the acuity of the sense-organ, though I think he means to include this too, in a rather confused way.

By observation he means, more or less unconsciously, sense-impression, sensation, the perception or identification of sensations, the spatial relatedness of perceptions, the remembrance of them, and the expression of them in a verbal or a graphic way. He hears that he cannot increase sensory acuity by training (I doubt this negation personally, as far as the young are concerned); and he takes this to mean that he cannot train perception, and so, to be in the fashion, he repeats his old dictum with less homage or even discards it in expression altogether. Of course, I am speaking of the teacher who *is* alive to current psychological teaching; he is the necessary and valuable melting pot of theory and practice. Moreover, I am speaking of theory, for in practice there is little change. Not only is there little change among the vast majority of teachers who are not aware that able men are trying to help forward the knowledge of the mental processes involved in education, but even among those who are. There remains the doughty antagonist—there are not many of him—who says, "I do not accept your findings. You work with adults; you work in laboratories under artificial conditions; and, even if your conclusions as to the analysed elements of mental life are true in isolation, we work with children; we work in schools, not in laboratories, and we work with synthesized products, not with isolated elements." Well, there is much in these objections, but the school also is artificial—a necessary artificiality perhaps—though all great men have not thought so; and children love to do, and can do, psychological experimental work, even with the brass instruments of the laboratory. The objection as to the isolated elements is strong; for psychological, like chemical, elements show new attributes after composition, which cannot always, to put it mildly, be inferred from the properties of the elements. But even then, would it not be admitted that analysis into elements has been of great value, say, to the science of chemistry, and indirectly of great profit to industry?

Then the apostle of the new science of experimental pedagogy—such junctures as the above are the *raison d'être* of his existence—steps forward and says, "Let us try in the schools, not forgetting our psychological analyses, nor neglecting the more roughly synthesized compounds of the teacher. Let us cease discussing specialists—the giants of observation—and come down to the children.

Is there any transfer or spread in this observational activity amongst school children? If so, how much, and how does it operate? And how should the ascertained facts influence our theoretical and practical pedagogy?'' To some experimental attempts to help towards an answer to these questions I now proceed.

II. A FIRST EXPERIMENT—GIRLS OF SCHOOL X

General plan of the experiment.—The method employed in this, the first experiment to be described, is that of equal, parallel, and highly correlated groups. A fairly homogeneous class of children was tested in observation four times at appropriate intervals; and, on the basis of the marks gained, was divided into the required two groups. One group was practised once a week in observation exercises, the other with a long and special set of questions in arithmetic, care being taken that both groups should regard their practice work as of equal importance. The preliminary observation tests had to some extent diminished the novelty of the observation exercises, but, of course, relative novelty as compared with arithmetic, still existed. We exercised no pressure on either group. Once, and once only, were their marks told to the children, namely, after the first practice exercises in arithmetic and observation respectively, and on no occasion, in this experiment, was any girl told how or why she had gained or lost marks; no praise or blame was meted out at any time. And we did not hurry the girls; they were given time to do all they could, both in the arithmetical and observational exercises. We did not rush on the exercises rapidly one after another, for such a plan is fatal to a result which really applies to school life. A whole month, or rather forty days, elapsed between the first and second practice exercises. It was not until toward the end of May—we began the practice exercises early in March—that the two groups were put together again for the final tests in observation, for which purpose we gave the same tests as, or similar tests to, those originally given in the preliminary work. Then, allowing some seventeen days to elapse before resuming the tests, we gave to the members of both groups two additional tests in which previous observational knowledge could be largely ruled out. This was the general plan of the experiment; a more detailed account follows.

The girls who did the work.—The school in which this experiment was conducted was a small municipal girls' school situated in the inner ring of London's southwestern suburbs. It was attended by children of parents who were, in the main, of the higher artizan

class and of those who followed what we now call "sheltered" occupations, 'bus-men, railway-men, tramway-men, with a few smaller shopkeepers. The children were well fed, satisfactorily and strongly clothed, and their housing accommodations were good. They were not so expensively or fancifully clothed as the children of the lower middle class, nor were they, on the whole, so likely to be subjected to some measure of intellectual stimulation at home as the children of the latter; but they were more robust and quite capable of good and protracted mental work. The school was in fairly good condition pedagogically, but it was certainly not then in the front rank. The class chosen to do the work was a Standard IV class, which was, in a month or two, to enter Standard V. The average register age was eleven years nine and one-half months; that of the children chosen for the practice exercises of Group A (the arithmetical group) was eleven years nine months, and of Group B (the observational group) was eleven years ten months. All the other work of the two groups during the period of the experiment, except the practice exercises, was precisely the same and was carried out according to the school time-table. The experimental work was done by the Head Mistress, who was experienced in the methods of experimental pedagogy.

The tests and their chronology.—During the first of the preliminary tests, all the girls in the class were told to write down all that they had observed about a tramcar. They were allowed as much time as they required, which usually approximated to 45 minutes. A similar scheme was followed throughout the other tests.

I. Preliminary Tests (Groups A and B):
   1) A tramcar ..... Tuesday, Feb. 22
   2) A busy stretch of high road ..... Thursday, Feb. 24
   3) A large local common (an open space municipally tended) ..... Tuesday, Mar. 1
   4) A grocer's shop ..... Thursday, Mar. 3

II. Practice Exercises:
   1) Group A worked sums
      Group B for ten minutes observed the teachers' room ..... Thursday, Mar. 10
   2) Group A worked sums
      Group B for ten minutes observed an ornamental stone vase ..... Wednesday, April 20
   3) Group A worked sums
      Group B for ten minutes visited a local public library (The members of the group were not allowed to ask questions or to converse on their way back to the school.) ..... Wednesday, April 27

4) Group A worked sums
Group B for ten minutes observed a number of miscellaneous objects, immediately recording their observations ..... Thursday, May 5
5) Group A worked sums
Group B, after a walk in the vicinity of the school, recorded their observations ..... Wednesday, May 11
6) Group A worked sums
Group B for ten minutes looked about a toy shop (The pupils were not allowed to talk during their visit to the toy shop or on their way back to the school.) ..... Wednesday, May 18

III. Final Tests (Groups A and B):
1) An omnibus ..... Wednesday, May 25
2) Grocer's shop ..... Wednesday, June 1
3) The local common ..... Wednesday, June 8
4) The stretch of high road written about (I-2) ..... Wednesday, June 15

IV. Additional Tests after an Interval (Groups A and B):
1) For ten minutes observed a number of miscellaneous objects, immediately recording observations ..... Wednesday, July 6
2) For ten minutes observed another set of miscellaneous objects, immediately recording observations ..... Wednesday, July 20

The marking of the tests and practice exercises in observation.— To those who may wish to repeat or amplify any of this work, I suggest a perusal of my monograph on *Children's Perceptions*,[1] where a large number of observations by children of all ages from three to fourteen years of age, infants, boys, and girls, are subjected to a close analysis, and the method of marking and assessment is set out in detail. Suffice it to say here that only observations count; they may be substantive, as of things and persons, they may be attributive, as of their sizes, colours, and shapes, and they may be active, as of the doings or movements of persons or things, or modifications of these movements in time, manner, or place; they may be spatial, as of the relative location of things. They may not count if they are opinions, inferences—unless the inference itself contains observations, which of course do count—or general reflections as to purpose or of other kinds. Mere talk, mere fluency, is ruled out, as at this age it generally should be, and must be at any rate for the

[1] Baltimore, Warwick and York, 1914. (Educational Psychological Monograph, No. 12)

purpose of this experiment. With these provisos, it will probably be sufficient if I give a few sentences from the work of one or two of the children, and show how these sentences were dealt with.

Ada K—, aged twelve years three months, wrote thus about a tramcar, in the first preliminary test:

"A tramcar is an object that goes by electricity. It is very tall and wide. There are seats inside for people. They are placed on both sides of the car. They are not chairs but long forms of polished wood and they are high from the ground. They are not plain wood, but are cut in deep ridges on the back, and also on the seat itself. Sometimes there is a gutter-percher mat which is at the bottom of the car for the people to walk on.

"There are also small forms of the same wood and carved just the same on the roof of the car," and so on, for nearly four pages of exercise-book paper.

A mark was awarded for "goes by electricity," for "tall," "wide," "seats," "inside," "for people to sit on" (as it was regarded, though purposive, as the result of an actual observation), "both sides," "long," "forms," "polished," "wood," "high from the ground," "cut in ridges," "deep," "on the back," "also on the seat itself," "sometimes," "mat," "gutter-percher," (no marks are, of course, subtracted for bad spelling), "bottom of car," "people to walk on," "forms," "smaller," "of the same wood," "carved just the same," and "on the roof" (London cars were not then covered in).

Elsie S—, aged thirteen years, whom we could not pair, wrote in one of the further additional tests:

"On the table is a sheet of paper with a brush, sponge, soap, and pummistone. There is a large piece of bark as well as a little piece. In between the two barks there is a bunch of everlasting flowers. At one side of the table there are three cherries a glass of water a loaf sugar a little bit of tea and a bit of apple which has been bitten," and so on for one and three-quarter pages of exercise paper.

Results.—I do not purpose citing in this paper the marks obtained for the practice exercises either in arithmetic or observation. They show the usual definite, steady, and positively correlated advance from exercise to exercise without which all practice exercises given to school children become suspicious. Especially are they suspicious when it is proposed to build any conclusions as to the spread of training or transfer from jerky or irregular up-and-down results; no, or little, transfer can, or ought to be, expected from practice exercises of that kind.

One more point before I set out the comparative tables of results; it came before us quite early in the exercises, and the attentive

reader will have already noted its likelihood. It was not statistically big enough to throw our experiment out of gear; but it certainly existed. Now and again a girl would make a quite unusual record. One girl made a most extraordinary record about an omnibus; she lived next door to a standing-place for omnibuses. Another girl, who made an extraordinary score on the High Street exercise, went

TABLE I

ACTUAL MARKS OBTAINED BY GROUPS A AND B RESPECTIVELY IN FOUR PRELIMINARY TESTS, FOUR FINAL TESTS, AND TWO ADDITIONAL TESTS AFTER AN INTERVAL

Pupils' Initials	Marks for Four Preliminary Tests	Marks for Four Final Tests	Marks for Two Additional Tests	Pupils' Initials	Marks for Four Preliminary Tests	Marks for Four Final Tests	Marks for Two Additional Tests
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Group A—Non-Practised				Group B—Practised		
A. K.	387	.....	.....	T. M.	331	523	236
P. E.	274	.....	.....	C. W.	282	376	193
B. H.	244	344	227	T. W.	252	514	269
C. E.	239	.....	.....	S. W.	244	.....	.....
T. C.	230	372	241	T. L.	230	735	362
A. A.	225	389	202	B. B.	226	510	263
R. R.	221	267	164	S. E.	220	435	235
T. M.	217	534	227	P. V.	208	450	243
G. W.	207	278	193	H. G.	205	590	233
T. G.	199	254	129	F. A.	204	381	194
B. N.	198	377	240	C. E.	198	513	237
R. M.	197	263	166	B. E.	192	227	200
K. E.	180	.....	.....	M. N.	187	306	187
A. E.	176	323	165	A. R.	180	301	176
J. W.	175	318	212	B. D.	173	374	282
W. E.	172	.....	.....	B. L.	171	277	179
M. M.	166	373	134	N. L.	165	266	150
T. I.	164	226	111	B. L.	161	328	195
S. E.	148	195	147	H. R.	155	493	183
Average marks	211	322	184	Average marks	210	423	223

shopping there every day—a business arrangement. A girl whose father was a tramway driver knew definitely an unusual amount about a tramcar, and a few girls lost some marks by giving botanical knowledge instead of their observations of flowers. Another girl, she was the only one, was so displeased with what she had written the first time about High Street, that she went afterwards specially to have a look, and, of course, showed a quite unusual increase.

We must expect such irregularities in work of this kind; they were few in number and did not invalidate our general result. The summary of individual results, Table I, shows the marks in the Preliminary Tests of Observation, the Final Tests, and the Additional Tests given after an interval. Certain comments may be made regarding this table.

1. The correlation coefficient (r) between the two series of individual results calculated to the nearest tens in the preliminary tests is 0.956: the difference between the two averages is .3 with a probable error of .228.
2. The correlation coefficient between the two series of individual results in the final tests, all girls pairing with those who have left the school being excluded, is 0.244: the difference between the means excluding absentees and their paired associates is 11.5 with a probable error of 2.278.
3. The r coefficient between the two series of individual results in the additional tests is 0.789, all girls pairing with those who have left being excluded as before: the difference between the means, necessarily different as before from the gross total already given, is 4.7, with a probable error of .576.
4. Group A, the non-practised group, shows an increase of approximately 63 percent calculated from the work of those who worked through the whole experiment, omitting leavers and their paired associates, from the preliminary to the final tests, and of 85 percent from the preliminary to the two additional tests, the calculations, of course, being made from the average per test in each case.
5. Group B, the group taking the practice exercises in observation, calculated in the same way, shows an increase of 103 percent from the preliminary to the final tests, and of 115 percent from the preliminary to the additional tests.

The results may be shown more compendiously, but less convincingly, perhaps, in Table II. Two girls left the school during the progress of the experiment, which lasted from Tuesday, February 22, to Wednesday, July 10, 1910. Their marks are not in any way included in this table.

General conclusions from the work of the girls of School X.— The girls of the practised group measured by the differential increments Group A and Group B in their preliminary work have gained a decided victory of approximately 40 percent. Of course, all the girls in both groups have been practised by means of the

preliminary and final, and the additional tests themselves; but there had been, throughout the whole experiment, no teaching of any kind, as the term is generally understood, nor even any correction of errors.

The practice exercises in observation which have been given to Group B, and to that group only, earning for it the appellation of "the practised group," have been very effective, as is apparent from the differential percentage gain in the final tests in observation.

TABLE II

SECTION BY SECTION, THE AVERAGE MARK PER CHILD PER TEST, OBTAINED BY GROUPS A AND B IN VARIOUS TESTS

Actual Marks in Four Preliminary Tests	Number of Girls	Average Mark		
		In Four Preliminary Tests	In Four Final Tests	In Two Additional Tests
(1)	(2)	(3)	(4)	(5)
	Group A—Non-Practised			
240 and over ..	1	61.0	86.0	113.5
220 to 240.....	3	56.2	85.7	101.1
200 to 220.....	2	53.0	101.5	110.0
180 to 200.....	3	49.5	74.5	89.1
Below 180.....	5	41.5	71.7	76.9
	Group B—Practised			
240 and over ..	1	72.0	117.7	116.3
220 to 240.....	3	56.2	140.0	143.3
200 to 220.....	2	51.5	119.7	128.3
180 to 200.....	3	47.2	84.2	100.0
Below 180.....	2	41.2	86.7	98.9

The contention of teachers, that the congeries or synthesis of functions which they call observation can be trained is amply justified. It is very unlikely that much, if any, improvement in actual sensory acuity has resulted from the tests and exercises of this experiment, though I would not assert that there is none from such an experiment lasting over six months. It is clear, however, that perceptive ability has been improved, and possibly the power to remember perceptions and to state them verbally. The character of the additional tests makes it extremely probable that it is in perceptual attention and ability itself, and possibly also in some advance in "short period memory," that the gain has mostly been made.

(To be continued)

LEADERSHIP IN EDUCATIONAL RESEARCH

B. R. Buckingham
Ohio State University

It is a good old custom, lately more honored in the breach than in the observance, to begin a discussion by a definition of terms. The leisurely, if somewhat ponderous, writers of an earlier day took time to indicate to the reader the sense in which certain terminology was employed. The modern demand for brevity leaves little opportunity for thus coming to an understanding with the result that author and reader sometimes fail to come within miles of each other in their thinking.

I am going to recognize as a leader in educational research one who combines conspicuously two characteristics. In the first place, he must exhibit intellectual leadership and that leadership will depend upon mental powers, knowledge, skill, and character. In the second place, he must exhibit human leadership. Here are understood the ability to get on with one's fellows and the ability to get people to work together. In short here are included all the things that have to do with human relationships.

In both intellectual and human leadership will be recognized an essential creative capacity. The leader must be able to visualize new situations. He must be able to forecast results by combining and applying known elements. The situations which he is able to visualize and the results which he forecasts may have reference to materials, to forces, or to men. It will readily be seen therefore that not routine operations but new conceptions mark the leader. He is a prime mover and not a mere transmission line.

With this preface I wish to talk to you a few minutes about the functions which I believe leaders of this sort can and should perform in educational research. There is urgent demand for quantity production. Heaven knows there were problems enough in education a generation ago; but the number has been greatly extended in the present era. Do you realize the possibility that we may be passing through a period in education more significant than any since the Reformation? Teachers and administrators are attempting to cope, sometimes intelligently and sometimes stupidly, with a vast, rising tide of seekers for instructional training.

I heard a man say a few days ago that since 1890 elementary-school attendance had increased twice as fast as the population of

the country and that the high-school attendance had increased thirty-one times as fast. These figures, startling though they may be, mean little until we understand what they involve. Consider the vast number of problems connected with the training of children of many different levels of intellectual ability. The problems of the curriculum, for example, are quite different now that we have many times the pupils we had thirty years ago. No words of mine are needed in support of this statement. But, if the treatment of the curriculum has been modified, if, indeed, the curriculum as a vital problem has actually been brought to view by the rapidly increasing student body, another field has been still more profoundly affected. The methods by which classes may be taught have undergone a silent but pronounced change. The teaching of high-school algebra or Latin or physics today demands a degree of pedagogical skill which nobody expected in an earlier day. The phenomenal increase in the number of students in secondary schools has led to a corresponding increase in the colleges. Within the past five years the problems of college teaching have not so much increased in number as actually presented themselves for the first time. As editor of the JOURNAL OF EDUCATIONAL RESEARCH I have been surprised at the large number of articles lately submitted concerning the problems of college entrance, guidance, and curricula.

Simultaneously with the enlargement of the number of persons served by the schools and perhaps to some extent related in a causal way to this increase, a deeper analysis of subject-matter and a more vital conception of the teaching function have come upon the scene. The present methods of studying the curriculum as set forth in the Twenty-sixth Yearbook of the National Society, the detailed treatment of textbook materials, the diagnosis of the intricacies of individual differences among pupils, the application of objective measurement to products and processes hitherto regarded as incapable of measurement—these are characteristic of contemporary thinking in education. They are, likewise, my reasons for saying we are in need of quantity production in research.

Now, quantity production means the enlisting of many workers. Just as the onset of an increased number of pupils in the schools means the reaching down into lower intellectual levels, so the demand for a greater number of workers in research means the tapping of new reservoirs of human effort. We see clearly that a tremendous number of problems cry aloud for solution. It is the task of leaders in research to state these problems, to formulate methods of attack-

ing them, and to organize, train, and inspire the privates in the ranks of an army of conquest.

That under proper guidance and with a wise selection of problems some teachers are capable of serving the cause of research is a thesis which I have long maintained. While therefore I am at this moment calling your attention to the leaders in research, it is impossible to avoid reference to the followers. There is no leadership unless there is someone to be led. Moreover, out of the ranks of the followers through a process of training and selection come most of the future leaders.

It is therefore clear to me that under the lash of necessity for ever greater and more intensive research, leadership will assert itself in one of its most effective ways when it devotes attention to the training of other workers. Of course, we have this sort of thing in our graduate schools, but I am thinking of the question in a more inclusive sense. It seems to me that research should go hand in hand with teaching throughout the entire range of educational effort. We are accustomed to regard research as a legitimate supplementary activity of a university professor. We ought to hold the same opinion with reference to the primary teacher; and just as some university professors carry a reduced teaching program because of their fitness for research, so I would have some public-school teachers carry a lighter teaching load in order that they might contribute to the increasing body of verified educational data.

If this position is well taken, then the training of workers in research is appropriate not only in college and university circles but also in public schools. There should be at the service of every school district a person who can exercise this type of leadership. I do not mean that every district should have a director of research. Several districts may combine in employing a director; or in any given district it is entirely possible that a superintendent or an assistant superintendent may perform the service I am suggesting. The name of the officer is relatively unimportant. What he is and what he does are the essentials.

There is an additional reason why teachers should be enlisted in research. There is an under-current of disappointment in the results of the test movement. This, to my mind, is because the point of view in testing has been chiefly administrative and supervisory. In many instances tests have been given in order that the superintendent might find out the quality of teaching. This is, indeed, a legitimate use of the tests as far as they are valid for the purpose. But, if this becomes the exclusive or the principal motive, teachers

cannot be blamed if they lack enthusiasm. If, however, the point of view is shifted from supervision to teaching, then the situation takes on an entirely different appearance. We may even continue to assert that the tests are to show how good the teaching is; but the person who is to be informed as to the goodness of the teaching is primarily the teacher himself rather than the supervisor or the administrator. Moreover, when results of tests—I mean the actual papers written by the children—are analyzed, the lessons of the analysis will be most fruitful when the teacher does the work.

The function of leadership in research may be clarified by indicating some of the characteristics of leaders and some of the shortcomings with which research is at present beset. Here are some of the desirable characteristics of a leader as I see them: In the first place, it is almost essential that a leader in educational research shall have had practical school experience. I admit that some conspicuous leadership has been furnished by men who were able to rise above the handicap of a lack of first-hand knowledge of classroom practice. But such leaders are rare and they fall into the category of geniuses for whom no rules are valid. Most of those who engage in research will need the steadying influence of direct school experience with children and young people. Too often the road to presumed expertness is through the college, the graduate school, the assistantship, and so on to the professorship—without any intervening school practice. To my mind real insight into the needs of the schools and the way to meet them can rarely be gained in a succession of university positions. Lecture courses in psychology, sociology, and education are not in themselves adequate preparation for research in education.

In the second place, the leader in research must possess a truly scientific method. He must be able to recognize typical blunders in method so that he may not only avoid them himself but instruct others in so doing. Moreover, he must be fertile in discovering ways to apply scientific method to educational problems.

In the third place, the leader should be able to analyze complex problems into their simpler elements and to organize an attack upon them in this divided form. He should likewise be able to coordinate the various parts of larger topics into an articulated whole so that cooperative research may be carried on by individuals who will thus mutually support each other. This is no more than to say that the research leader should be able both to analyze and to synthesize materials for research purposes. Related to this power is the ability to select significant problems. The leadership of eminent men in

chemistry, electricity, psychology, and other scientific fields often rests upon their capacity to see problems.

In the fourth place, the leader should be a scholar in his field. No man can take high rank in educational research who is not well read. Over a rather wide area he must have general information, but his knowledge must be within a chosen field. He cannot assign problems intelligently without this knowledge. It is the best safeguard against duplication and waste. I suppose a hundred men during the past two or three years have been engaged in correlating high-school marks with intelligence as measured by mental tests. They are doing this under the impression that they are engaged in research. Their time would be better spent on something else.

In the fifth place, the leader should have what may be called "extractive power." This means that he will be able to secure information from persons who, under different circumstances, would be unable or unwilling to give it. This extractive power is a quality that not only inheres in the leader but is an evidence of his accepted position. In other words, he not only prepares his appeal impressively, but he succeeds in securing attention to it by the force of his own admitted leadership.

One might go on almost indefinitely in listing the qualities of leadership. But, in order that we may bring this paper within reasonable limits, let us conclude by turning for a moment to some of the shortcomings of research, shortcomings which arise through lack of competent leadership. There is a disposition in some quarters to minimize good judgment in research work. I have in mind a man who is doing an exhaustive piece of work in formulating a vocabulary for each grade of the elementary school. After having brought together all his objective data, and after using his data as far as they carry him, he proposes to go further. He is going to include words not found in any of his sources because he thinks they ought to be included. Moreover, he is going to grade some words higher than his records indicate, and others he is going to grade lower. For example, if he finds that he has already included the words *north*, *east*, and *south* in his first-grade list and if he finds that *west* is not on his list, or that it is on it for another grade, he is going to include *west* in the list for Grade I. If he finds that he has five of the days of the week for the second grade, he is going to put the other two days in the same list. If most of the names of the months turn up for the third grade, he intends to put the rest there. In short, after he has gone so far as his statistics carry him, he is going to apply the principal of word grouping. There are those

who believe that this is not scientific, but the blind following of figures, confessedly incomplete, is not scientific either. One of the finest gifts which a research worker can acquire is the courage to quit figuring when figures will no longer serve.

To my mind there is always in research an opportunity for expert judgment. Too much of our research is on a low level because it is uninformed of the spirit. The mere tyro can figure almost as well as the expert. In fact, the more immature some of these persons are, the more violently they compute. The leader, on the other hand, knows not only the strength but the limitation of his figures. He will not abrogate his right to think beyond them, although he will indicate clearly how far they have carried him.

Finally, I think much of the work which bears the name of research suffers from incompleteness. Too many workers are essentially beginners. They never become anything else. The history of their activities is a succession of first chapters, or perhaps only of prefaces. They live their professional lives forever under the heading of "unfinished business." Thousands of research projects have been started by those who lack the will to carry them to the point of fundamental and satisfactory results. Study after study appears in print which claims no other virtue than that of being a beginning. No doubt this is often necessary, but in many instances it can be avoided. Indeed, it might be expected that the research worker himself would carry forward the project at a later time. We have ten insufficient tests for every one which has been well standardized and validated. We have a hundred schemes for utilizing the results of testing for every one that has been thoroughly worked out. We have a thousand tested children for every one who has received the maximum benefit from the testing.

In this plea for leadership in research I have asserted that due to the educational conditions of today, there is a need of quantity production in research. In order to produce the verified and scientifically defensible body of knowledge which is thus demanded, there must be leaders and followers. I have tried to give some of the qualities of leadership which seem to me to be desirable. The leader should have practical school experience. He should be able to enlist the support and win the confidence of teachers. He must be able to train workers. He must have the ability to analyze larger problems into their simpler elements and to combine selected parts of complex problems for the purpose of cooperative research. He must be a scholar in his chosen field and must be able to state problems with authority. If he is a real leader he will have what I have

called "extractive power." He will be able to put his program over and to secure from people who would otherwise be indifferent the information he needs. He will be well informed as to the nature of scientific method and will know how to apply such a method to educational data. On the other hand, he will know the limitations of strictly objective treatment. He will be expert in thinking as well as in figuring. He will follow the figures where they lead, impartially and without bias or prejudice, but he will know how to interpret them and to supplement them. Finally, he will study a question long enough and hard enough to bring out something more substantial than tentative conclusions or a timid turning over of his chosen question to the educational public for further study.

TEACHING SPELLING BY COLUMN AND CONTEXT FORMS

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THE task assigned to the school in the teaching of spelling is to provide the pupils with the abilities which are needed to meet successfully those situations in life, that require an ability to spell. If this assumption is warranted, it is clear that instruction in spelling fails to realize its full purpose until pupils are able to spell correctly the words which they use in connected written discourse.

Spelling is generally taught in column form. The ability to spell words correctly in columns, however, is no assurance of ability to spell them correctly in context form. Studies by Ashbaugh (1), Cook and O'Shea (3), Hunkins (5), McKee (6), Tidyman and Brown (8), and Wallin (9), have shown a "loss in transfer" from column to context form, which varied from 3 to 23 percent.

The use of context exercises has been suggested as a means of securing greater spelling ability in context form. The evidence on this particular problem is meager. Winch (10) found that pupils who studied words in column form possessed greater ability to transfer these words into cursive dictation than did pupils who studied the same words in context form. Hawley and Gallup (4) reported results which showed that pupils who studied by the column form learned more words and showed greater ability in transferring these words into sentences than did the pupils who studied by sentence form.

The purpose of this report is to present the results of an investigation, carried on by the writer during the years 1923-24, to determine the relative efficiency of the common column form and certain context forms in the teaching and testing of spelling. The definition of efficiency used herein is limited to the three items: (1) the improvement in spelling ability obtained during one week's time of study and testing, (2) the ability to spell previously studied words when a period of nine weeks had elapsed after the regular teaching process had been completed, and (3) the ability to spell words previously studied in new context form.

THE INVESTIGATION

Space cannot here be given to a detailed description of such items as the source of data, the method of investigation, the administration of the experiments, or the construction and use of ma-

terials. Such detailed discussion will be found in the unpublished report of the investigation entitled, "Teaching and Testing Spelling by Column and Context Forms" (7).

The investigation included three experiments, Experiment A, designated herein as the column-phrase form; Experiment B, the column-sentence form; and Experiment C, the column-paragraph form. Experiment A sought to determine the relative efficiency of column and phrase methods of presenting the words; Experiment B was an attempt to compare the efficiency of the column and sentence forms; and Experiment C provided a measurement of the difference in efficiency in column and paragraph forms. The present article covers a statement of the problem of the entire investigation, a brief discussion of the methods and materials used in all experiments, and the results of the column-phrase experiment. A report of the results of the two remaining experiments will appear in this Journal in the near future.

Approximately 275 seventh-grade pupils of Iowa and Minnesota provided some fifty thousand spelling papers from which the original data were taken. A total of 480 words, 160 in the case of each experiment, selected from the seventh-grade word list of the *Horn-Ashbaugh Speller*, constituted the word list used.

All pupils were given a preliminary spelling test composed of 100 words taken from the *Iowa Spelling Scales* (2). The application of Brown's formula[1] to the correlation of chance halves of this test gave a reliability coefficient of 0.94. Upon the basis of the scores of the preliminary test, the pupils were placed in one or the other of two groups of equal spelling ability. These groups were arbitrarily designated as Group A and Group B.

The entire investigation consisted of twenty-four lessons. The first eight lessons were devoted to Experiment A. During the first four lessons, Group A used the column form and Group B, the phrase form. The groups were shifted during the second four lessons. This same procedure was followed in Experiment B (Lessons 9-16) and in Experiment C (Lessons 17-24).

The method of teaching was that suggested in the *Horn-Ashbaugh Speller*.[2] This method provides that the spelling lesson, consisting of twenty words, be continued for a period of one week.

[1] Kelley, Truman L. *Statistical Methods.* New York, Macmillan Company, 1923. p. 205.

[2] Horn, Ernest, and Ashbaugh, E. J. *Lippincott's Horn-Ashbaugh Speller.* Chicago, J. B. Lippincott Company, 1920. pp. vii-xx, 66.

Each week's lesson involves five daily spelling periods of fifteen minutes each. Provision is made for initial, mid-week, and final testings during the week. Thus one was able to obtain a measurement of initial and final spelling ability on each lesson, and consequently a measurement of improvement. Throughout the entire investigation this method, with one exception, was followed exactly in all its details. The deviation refers to the fact that whenever a pupil used a context form, he studied the words in this form and was tested during the week on that form.

Two forms of the material used for study purposes in place of the regular textbook were constructed for each lesson, a column form and an appropriate context form. In each case the twenty words of the lesson were printed in boldface type. In the context form all other words were printed in plain type. Lack of space will not permit the printing of a sample of each context form. The two forms of a lesson, column and context, are shown in Figure 1.

Column Form

arriving
institution
enrolled
junior
difficulty
describe
interesting
attraction
interests
surprised
conservatory
museum
considerably
ordinary
considerable
excitement
semester
gradually
thoroughly
adapted

Paragraph Form

Parnell College
Parnell, Vermont
September 15, 1923

Dear Mother,

Upon **arriving** at this **institution** I **enrolled** in the **junior** class with little **difficulty.** I wish I could **describe** all the **interesting** things. Every **attraction** **interests** me greatly. I was not **surprised** to find the music **conservatory** and the **museum** **considerably** above the **ordinary.** There is **considerable** **excitement** as the **semester** opens, but I am **gradually** getting **thoroughly** **adapted.**

With love,

Mabel

Figure 1. A Lesson in Column and Context Forms

The materials used for testing purposes during the week consisted of typed tests, and full directions were given to all teachers. The context test was always the same context as that from which pupils studied. The rate of dictation was established by previous experimentation. The column test was the same as the usual column test.

Tests of delayed recall were given nine weeks after the last regular testing on a given lesson had been completed. These tests consisted of a new context test and a column test for each lesson.

In every case both forms of the test were given to both groups of pupils. Thus, a measurement of the ability to spell words previously studied and the ability to transfer these words into new contexts was obtained for both groups.

RESULTS OF THE COLUMN-PHRASE EXPERIMENT

Measurement of improvement.—The first measure of efficiency is expressed as the amount of spelling ability acquired during a period of one week. Three methods were used for comparing improvement. The first of these treated the entire groups as units and provided proper measures of central tendency and variability. Table I shows a comparison of the gains made by the two groups from the initial to the final tests for each lesson. This table should be read in the following manner: The Column Group secured a mean score of 13.44 on the initial test of Lesson 1 and a mean score on the final test of 18.11. The measures provided for the Phrase Group should be read in the same manner. The difference between the mean scores of the two groups on the initial test was .38; the probable error of this difference was .37. Similar measures for the final test were .78 and .25. The difference and probable error are italicized in those cases in which the difference between the two means was significant.

In six of the eight lessons, the two groups possessed approximately equal ability at the beginning of the week's work. A significant difference existed between the mean scores of the two groups on the final tests in these six lessons which favored the Column Group. In the two remaining lessons a significant difference existed between the mean scores on the initial test; this fact does not permit accurate calculation of relative improvement. It should be noticed, however, that in these two lessons the difference was more significantly in favor of the Column Group on the final test than on the initial test. These obvious facts show that the Column Group secured greater improvement in spelling ability than did the Phrase Group.

A second method of comparing the improvement made by the two groups involved the use of a plan by which both groups were sectioned for the comparisons made in each lesson upon the basis of the scores made on the initial test. Section 1 included all pupils whose scores on the initial test fell between 16 and 19. Section II included all pupils whose scores fell between 12 and 15; the limits of Section 3 were 8 to 11; those of Section 4, 4 to 7; and

those for Section 5, 0 to 3. Comparisons of improvement were made by checking the average improvement of the section of the Column Group against that of corresponding section of the Phrase Group. Space will not allow the presentation of detailed tables showing the initial and final mean scores of each section for each lesson. Table II, a summary tabulation, shows, for each of the eight lessons, how much the section of one group was superior to the correspond-

TABLE I

COMPARISON OF IMPROVEMENT OF THE COLUMN GROUP AND PHRASE GROUP

GROUPS	MEANS		DIFFERENCE OF MEANS		PROBABLE ERROR OF DIFFERENCE	
	Initial	Final	Initial	Final	Initial	Final
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lesson 1:						
Column	13.44	18.11	.38	*.78*	.37	*.25*
Phrase	13.06	17.33				
Lesson 2:						
Column	13.63	18.57	.29	*.97*	.38	*.24*
Phrase	13.92	17.60				
Lesson 3:						
Column	13.33	18.25	.22	*1.61*	.32	*.37*
Phrase	13.65	16.64				
Lesson 4:						
Column	14.50	18.58	*1.55*	*1.00*	*.41*	*.23*
Phrase	13.05	17.58				
Lesson 5:						
Column	13.71	18.76	.18	*1.09*	.39	*.25*
Phrase	13.50	17.67				
Lesson 6:						
Column	15.08	18.80	.03	*1.23*	.34	*.23*
Phrase	15.05	17.57				
Lesson 7:						
Column	14.41	18.42	*1.56*	*1.66*	*.37*	*.24*
Phrase	12.85	16.76				
Lesson 8:						
Column	15.45	18.92	.81	*1.00*	.38	*.23*
Phrase	14.64	17.92				

ing section of the other group in the average gains made from the initial to the final tests.

Using Lesson 1 as an example, Table II shows that Section 1 of the Column Group procured a mean improvement during the week which was .6 greater than that procured by Section 1 of the Phrase Group. There were 35 cases in the column section and 40 in the phrase section. Section 2 of the Column Group secured a mean improvement during the week which is 1.19 greater than that

procured by the corresponding phrase section. There are 43 cases in the column section and 44 in the phrase section. The numbers in italics denote that there was not a significant difference between the mean scores of sections involved in the initial test, but that a significant difference did exist between the mean scores on the final test, in favor of the section indicated. Table II shows that the column sections were decidedly superior in the amount of improve-

TABLE II

AVERAGE GAINS MADE BY CERTAIN SECTIONS OF THE TWO GROUPS

GROUP	SECTION 1 (16-19)		SECTION 2 (12-15)		SECTION 3 (8-11)		SECTION 4 (4-7)		SECTION 5 (0-3)	
	No.	Gain	No.	Gain	No.	Gain	No.	Gain	No.	Gain
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Lesson 1:										
Column	33	*.6*	43	*1.19*	22	*1.28*	11	.....	3	.....
Phrase	40	.....	44	.....	20	.....	14	*1.5*	3	.66
Lesson 2:										
Column	32	.18	39	*1.18*	19	*2.22*	12	*2.01*	5	.6
Phrase	52	.....	39	.....	16	.....	10	.....	3	.....
Lesson 3:										
Column	30	*.69*	24	*3.21*	16	*3.62*	8	*1.25*	2	.....
Phrase	27	.....	16	.....	8	.....	8	.....	2	*7.0*
Lesson 4:										
Column	38	*.49*	40	.02	19	.49	5	.3	4	.....
Phrase	43	.....	30	.....	20	.....	19	.....	6	.42
Lesson 5:										
Column	50	*.50*	31	.55	33	.91	13	.93	3	*5.17*
Phrase	39	.....	36	.....	30	.....	7	.....	4	.....
Lesson 6:										
Column	57	*.50*	33	*.79*	12	*2.15*	7	*4.9*	1	*3.0*
Phrase	58	.....	33	.....	16	.....	5	.....	2	.....
Lesson 7:										
Column	53	.07	43	*.80*	15	*1.33*	9	*2.33*	2	*4.0*
Phrase	35	.....	40	.....	28	.....	12	.....	4	.....
Lesson 8:										
Column	63	*.40*	30	.37	17	*1.34*	3	.....	1	.5
Phrase	36	.....	25	.....	12	.....	3	.....	2	.....

ment made during the week. The reliability of these results is limited by the small number of cases involved in the comparisons.

The third method of contrasting the relative improvement took account of the percent of pupils who improved or failed to improve. The detailed tables of these percents cannot be given here; a summary of the results will be sufficient. The Column Group was superior to the Phrase Group in all the lessons measured by four different sorts of comparisons, namely, (1) continuous improvement during the week, (2) improvement from initial to final test,

(3) improvement from the initial to second test, and (4) improvement from second to final test. On all of the lessons the Column Group had a larger percent of pupils who procured perfect scores on the second test, while on six of the eight lessons this group also had a larger percent who obtained perfect scores on the final test.

TABLE III

COMPARISON OF THE ABILITY OF THE TWO GROUPS ON TESTS OF DELAYED RECALL

Group	Means	Difference of Means	Probable Error of Difference
(1)	(2)	(3)	(4)
Lesson 1:			
Column	15.86	*1.78*	*.37*
Phrase	14.08		
Lesson 2:			
Column	17.38	*1.69*	*.29*
Phrase	15.69		
Lesson 3:			
Column	14.44	*1.78*	*.37*
Phrase	12.66		
Lesson 4:			
Column	15.97	*2.15*	*.42*
Phrase	13.82		
Lesson 5:			
Column	16.03	*1.14*	*.32*
Phrase	14.89		
Lesson 6:			
Column	16.84	.35	.33
Phrase	16.49		
Lesson 7:			
Column	15.88	1.01	.34
Phrase	14.87		
Lesson 8:			
Column	16.43	.62	.36
Phrase	15.81		
Pooled Measures:			
Column	16.00	*1.01*	*.13*
Phrase	14.99		

Judged by these criteria, the decided superiority of the Column Group indicated that greater improvement was procured during the weekly lesson by the Column Group than by the Phrase Group.

Measurement of ability to spell when a period of time has elapsed.—The second definition of efficiency, given in this report, referred to the ability to spell words previously studied. Tests of delayed recall covering a particular lesson were given nine weeks after the lesson had been taught. The test was given to the Column

Group in column form and to the Phrase Group in context form. Table III shows the comparison of the spelling ability of the two groups on the tests of delayed recall.

The mean score of the Column Group on the first lesson recorded in Table III was 15.86, while the similar score for the Phrase Group was 14.08. The difference between the means of the two scores was

TABLE IV

COMPARISON OF THE TWO GROUPS IN ABILITY TO SPELL WORDS IN NEW PHRASE FORM

Group	Means	Difference of Means	Probable Error of Difference
(1)	(2)	(3)	(4)
Lesson 1:			
Column	15.20	1.12	.39
Phrase	14.08	.....	.....
Lesson 2:			
Column	16.72	1.03	.36
Phrase	15.69	.....	.....
Lesson 3:			
Column	13.48	.82	.38
Phrase	12.66	.....	.....
Lesson 4:			
Column	15.18	*1.36*	*.43*
Phrase	13.82	.....	.....
Lesson 5:			
Column	15.07	.18	.36
Phrase	14.89	.....	.....
Lesson 6:			
Column	16.32	.83	.32
Phrase	16.49	.....	.....
Lesson 7:			
Column	15.14	.27	.34
Phrase	14.87	.....	.....
Lesson 8:			
Column	15.62	.19	.30
Phrase	15.81	.....	.....
Pooled Measure:			
Column	15.29	.37	.13
Phrase	14.92	.....	.....

1.78, and the probable error of this difference was .37. The mean scores for the other lessons are similarly stated. The numbers italicized again denote significant differences.

Significant differences were found in five of the eight lessons, in favor of the Column Group. In the remaining three lessons the Column Group secured a mean score which was greater than that of the Phrase Group though not too statistically significant. When

the scores of all eight lessons were pooled in such a manner that a distribution of each group over all the lessons was obtained as a unit, and the comparison was made between the mean scores thus procured, the result was decidedly in favor of the Column Group. These facts show that the Column Group was decidedly superior in its ability to spell words previously studied.

Ability to spell words previously studied when presented in new phrase form.—The third test of efficiency was the measurement of the ability to spell words previously studied when used in a new context. Tests of delayed recall were arranged in both forms. The two forms of the test were given to the pupils of each group. By comparing the mean scores of the Column Group on the context test with that of the Phrase Group on the same test, one obtained a comparison of the ability of the two groups to spell words previously studied when used in a new phrase form. Table IV shows this comparison. The italicized numbers of this table show that in only one lesson did a significant difference exist between the mean scores of the two groups. In this one case the Column Group showed a significant superiority. When the lessons are pooled no significant difference is brought to light. These facts indicate that the two groups possess approximately equal ability to spell words previously studied when used in a new context.

The three outstanding facts provided by the results of the column-phrase experiment are:

1. As determined in this investigation, pupils who studied and were tested by the column form seemed to have acquired a greater amount of spelling ability than did the pupils who studied and were tested by the phrase form.

2. The pupils of the Column Group procured better scores than the Phrase Group when tested in their ability to spell words previously studied.

3. The two groups seemed possessed of approximately equal ability to spell words previously studied when the words were used in a new phrase form.

(*To be continued*)

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A STUDY OF GEOMETRIC ABILITIES AMONG BOYS AND GIRLS OF EQUAL MENTAL ABILITIES

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THIS study was attempted to determine the extent to which boys and girls of approximately equal mental ability—as determined by a standard intelligence test—differed in their geometric ability. A study of the literature on sex differences reveals the fact that none of the reported experiments in this field has taken into account the factor of intelligence, although this is a factor which might materially affect the interpretation of results by concealing any real sex differences that might exist.

PREVIOUS INVESTIGATIONS

Educational investigations have too often dealt with mass measures from which have been drawn conclusions that are unreliable. In this study, we have sought to avoid that difficulty by classifying the sexes into groups of equal, or approximately equal, mental ability and then by making detailed comparisons among these groups.

Clear experimental evidence of sex differences in geometric ability is rare. Thorndike, in reporting results as measured by the Regents' Examination, states that in mathematics 57 percent of the boys reaches or exceeds the score for the median girl.[1] Touton, after a critical analysis of the achievements of twenty-eight hundred New York high-school students in solving geometric originals, reports that 60 percent of the boys excelled the median girl in numerical exercises, 66 percent in construction exercises, and 61 percent in exercises requiring proof.[2] Minnick found, on making a study of the grades in high-school geometry at Bloomington, Indiana, that the average grade of the boys was 81.3 and of the girls, 81.0; also, that 18 percent of the boys had failing grades, compared to 17 percent of the girls.[3] Thorndike and Touton concur in

[1] Thorndike, E. L. *Educational Psychology*. New York, Teachers College, Columbia University, 1921. Vol. III, p. 183.

[2] Touton, F. C. "Sex Differences in Geometric Abilities," *Journal of Educational Psychology*, 15: 242, April, 1924.

[3] Minnick, J. H. "A Comparative Study of the Mathematical Abilities of Boys and Girls," *School Review*, 23: 73-84, February, 1915.

the opinion that the differences are so small and so uncertain as to give no ground for segregating the sexes.

As to the variability of the sexes, Thorndike makes the following statement:

> Except in the two years nearest the age of puberty for girls, the male sex is slightly more variable. From the time of puberty for boys to maturity this difference seems to increase rapidly, though the records of marks which support this conclusion are not the best evidence.[4]

Touton states a contrary finding—which is also borne out by this study—when he reports that "the data show that for the groups considered [students who pass the Regents' Examination in plane geometry] and for the trait in question [ability to solve geometric originals], boys are 0.87 as variable as girls," that is, boys are less variable than girls.[5]

THE PRESENT EXPERIMENT

The following California high schools, Glendale Union High School, Manual Arts High School of Los Angeles, Pasadena High School, Hollywood High School, and Long Beach High School, were selected to furnish the subjects for the experiment because there were on file in each school records of intelligence quotients derived from the Terman Group Test of Mental Ability. The Webb Geometry Tests, Forms A and B, were used to measure geometric ability. These tests have been shown to be both valid and reliable. In both of these features they differ materially from the tests heretofore used in measuring geometric ability.

All tests in geometry were given during the last week of the semester to the students who were completing their year's course in geometry. They were given in each case under the supervision of the head of the Mathematics Department and under standardized conditions. Where one student took both forms, the second form followed the first from one to three days later. Four hundred and ten boys and 349 girls took both forms. All of the second-semester students of geometry in Manual Arts High School and those from seven classes in the Hollywood High School took either one form or the other, but not both. The entire number of boys tested was 624 and of girls, 506.

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[4] Thorndike, *Op. cit.*, p. 194.

[5] Touton, F. C. *Solving Geometric Originals.* New York, Teachers College, Columbia University, 1924. p. 48. (Teachers College, Columbia University, Contributions to Education, No. 146)

Care was taken at all times to see that no differentiation was made between the conditions under which boys and girls took the test. The scoring was done by teachers of geometry in the various schools and by some students in the Summer Session of the University of Southern California. In every case, use was made of keys provided for the tests, and all papers were rechecked.

As far as the data warrant, answers are given to the following questions: What is the difference between the mean test scores of boys and of girls who were previously classified into comparison groups of approximately equal general mental ability? Which sex shows the greatest spread in geometric ability on the several mental-age levels?

BASIS OF CLASSIFICATION

The basis for the classification of the students considered in this study was mental age, determined by intelligence quotients derived from the scores in the Terman Group Test of Mental Ability and the chronological ages of the students at the time of taking the geometry tests. For purposes of comparison the students were divided into the following five groups:

Group	Mental-Age Limits
I	Eighteen years six months and over
II	Seventeen years six months to eighteen years five months
III	Sixteen years six months to seventeen years five months
IV	Fifteen years six months to sixteen years five months
V	Fifteen years five months and under

Table I shows, for each form of the test, the mean scores for boys and girls, the standard deviations of the differences, and the significance of the differences. It is interesting to note how closely the two forms agree in their results. The mean score for the boys on Form A is 46.9 as compared with a mean score of 43.0 for the girls—a difference of 3.9 points in favor of the boys. On Form B the mean score of the boys is 44.4 as compared with a mean score of 39.2 for the girls—a difference of 5.2 again in favor of the boys. The standard deviations of the differences of these mean scores are 1.2 and 1.4, which are sufficiently low in comparison with the differences of the mean scores, 3.9 and 5.2, to give significance to these differences which indicate a superiority for the boys.

When we come to note the difference between boys and girls in the different mental-age groups, however, we find that there is considerable lack of correspondence between the sex groups in both

ability and variability. To determine the significance of the differences between the mean scores of the boys and girls in each mental-age group, the differences between the means were expressed as multiples of the standard deviations of the differences, shown in column 7 of Table I. The groups where the differences are of the least significance are Group I, in which the girls excelled the boys, and in Group III. In these groups the standard deviations of the differences are either almost equal to or greater than the differences

TABLE I

COMPARISON OF THE SCORES OF THE BOYS AND GIRLS IN FORMS A AND B OF THE WEBB GEOMETRY TEST

Mental-Age Group	Number		Mean Scores		$\frac{SD}{\sqrt{}}$ (Diff.)	Diff. $\frac{SD}{\sqrt{}}$ (Diff.)
	Boys	Girls	Boys	Girls		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Form A					
I	77	56	57.6	61.5	2.8	1.4
II	121	92	52.5	46.5	2.4	2.4
III	120	101	43.8	44.8	2.3	0.5
IV	103	94	44.6	37.2	2.1	3.5
V	92	78	37.3	30.8	2.4	2.7
Total	513	421	46.9	43.0	1.2	3.3
	Form B					
I	80	54	55.5	57.6	3.4	0.6
II	122	96	50.2	42.3	2.7	2.9
III	118	117	43.1	40.5	2.6	1.0
IV	101	92	39.7	30.0	2.3	4.3
V	100	75	34.2	29.7	2.9	1.5
Total	521	434	44.4	39.2	1.4	3.9

which fact indicates that the sex differences, shown by the mean scores in these groups, are of little or no significance. In the other three groups, where the boys excel the girls in mean scores, the differences range from 1.5 to 4.3 times the standard deviations of the differences, which fact indicates for sex groups on these levels a superiority for the boys.

In order that some conception of the overlapping of the two sex groups might be obtained, median scores were also computed for the two forms of the test. The percent of boys reaching or

exceeding the girls' median score for both forms is given in Table II. Here, findings regarding differences between the sexes within the groups on each mental level, as tabulated in Table I, are brought out. In Form A, 59 percent of the boys reaches or exceeds the median score of the girls, and in Form B, 65 percent. In Groups I and III, where the superiority was doubtful, such differences as do exist indicate superiority in Form A for the girls in Group I, and in Form B for the boys in Group III. In Groups II, IV, and V, the superiority decidedly favors the boys; the strongest evidence is given in Group IV in which 73 percent and 75 percent of the boys reach or exceed the median score of the girls in Forms A and B.

TABLE II

PERCENT OF BOYS WHOSE SCORES ON THE GEOMETRY TESTS REACHED OR EXCEEDED THE MEDIAN SCORE OF THE GIRLS

Mental-Age Group	Form A	Form B
(1)	(2)	(3)
I	38	49
II	65	69
III	48	61
IV	73	75
V	64	55
Total	59	65

It should be noted further that the mean scores of the girls of Group II as shown in Table I, are 15 points and 13.3 points below the mean scores of girls in Group I in Forms A and B, respectively. The mean geometric ability of the girls in Group II is practically at the same level as that of the girls in Group III. As a possible explanation of this condition, it seems probable that geometry makes a special appeal to a few girls of exceptionally high intelligence. The mean scores for the boys for the several mental-age groups seem to conform more nearly to what one would expect from their gradations on mental ability.

A comparison of the mean scores (see Table I) of boys and girls on both forms of the tests in geometry also shows that in general—Group I excepted—the mean score of the boys in each mental-age group is approximately equal to the mean score of the girls in the

mental-age group next above. This seems to indicate that, on the average, girls must attain about one more year of mental growth in order to compete favorably with boys in geometric achievement.

Table III shows the variability of boys and girls as measured by the results on the two forms of the test.[6] Again we find close agreement between the results obtained on the two forms of the test. Girls show greater variability in every mental-age group except that one which includes those having mental ages of eighteen and a half or more. The ratio of the boy-girl variability on the total test scores is 0.93 and 0.90 on Forms A and B, respectively. This evidence supports the conclusion of Touton in his study of the

TABLE III

VARIABILITY OF MIDDLE SIXTY-EIGHT PERCENT OF BOYS AND GIRLS IN GEOMETRIC ABILITY

MENTAL-AGE GROUP	FORM A			FORM B		
	Coefficient of Variability		Ratio of Variability	Coefficient of Variability		Ratio of Variability
	Boys	Girls		Boys	Girls	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I	.31	.23	1.35	.38	.33	1.15
II	.34	.38	.89	.40	.46	.87
III	.36	.39	.92	.44	.50	.88
IV	.36	.37	.97	.42	.50	.84
V	.44	.49	.90	.59	.59	1.00
Total	.39	.42	.93	.47	.52	.90

twenty-eight hundred New York high-school students, in which he found the ratio of boy-girl variability to be 0.87. As this study also considers a large number of cases, the evidence on less variability among boys than among girls in geometric ability seems conclusive.

CONCLUSIONS

When boys and girls are compared without reference to mental ability, test scores seem to indicate that boys as a group are superior to girls in geometric ability. However, when compared

[6] The variability coefficients were obtained from Pearson's formula for the coefficient of variability,

$$V = \frac{SD}{M}$$

after classification into groups of various mental-age levels, other differences appear which are given in the following summary paragraphs:

1. The superiority in geometry of the boys over the girls of the same general intelligence seems to be the most marked at the lower mental-age levels where we find the greatest and most significant differences between the mean scores in geometry of boys and girls.

2. Girls having mental ages of more than eighteen years six months not only seem to do work in geometry much superior to the girls in the lower mental-age groups, but also seem to excel the group of boys of equal ability.

3. Girls, in general, attain one more year of mental maturity than boys before their achievement in geometry is comparable to that of the boys.

4. In geometric ability, girls are more variable than are boys when the middle 68 percent of the cases are considered.

5. The differences in geometric achievement between boys and girls at different mental-age levels tend to show that those studies of sex differences, which neglect to take into account the factor of mental ability, fail to discover significant differences between sex groups which may exist at one mental-age level, but not at another.

A CURRICULUM STUDY OF IDEALS AMONG JUNIOR HIGH-SCHOOL PUPILS

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THIS study embodies an attempt to discover the types of persons uppermost in the minds of junior high-school pupils, together with the reasons why these persons hold an appeal for pupils at this age. The underlying assumption was that children have, by this time in their school careers, collected the names of a considerable number of persons who stand out in their minds as having contributed to human activities in ways which represent leadership. It was hoped that the results obtained would provide some indication as to whether the use of biographical material in the program of studies needs modification. The present report is but part of a larger study and has to do with the results obtained in a single junior high school in Berkeley, California; one which has been established for more than ten years and has a progressive but well-established policy consistent with the best features of the junior high school.

Under the direction of the principal, the teachers devoted one period on a given day to compliance with the following request:

> Write on the blackboard the request given below and ask the pupils to comply with it. Please do not give them any direct assistance, let it be their *own* work. If they cannot think of twenty-five names have them list as many as they can. ALSO please assure them that this work has nothing to do with their school marks. Do not allow more than thirty minutes for the exercise. The request is:
>
> > List the names of twenty-five men and women whom you think of as leaders, either in the past or at the present time. Tell why you think each has been, or is, a leader.

Table I shows the distribution of the number of persons named by individual pupils.[1] Nine boys and one girl in Grade VII mentioned the names of not more than two persons, while four boys and five girls of the same grade listed three, four, or five persons. The number of boys and girls in each grade is indicated, as well as the number who mentioned the varying numbers of leaders.

It is clearly evident that this group of pupils found it difficult to recall and write down the names of twenty-five persons. The

[1] The results were assembled and tabulated by groups of graduate and advanced students of the Department of Education, at the University of California.

contributory evidence to this conclusion is found in two facts. In many of those lists which extended beyond fifteen or twenty names, there was contained among the last five or ten a large proportion of local characters, teachers, city officials, and the like, whereas, in general, such persons were not mentioned in the early portions of the lists. Also, in at least a half-dozen different short lists, the quota of ten to twenty names was filled up by naming presidents of the United States exclusively, or by listing the leaders of bands and orchestras only, or by giving the names of players on a single athletic team, and so forth. This may have been an attempt to be "smart," but in view of the large number of pupils who did

TABLE I

NUMBER OF PERSONS MENTIONED BY INDIVIDUAL PUPILS

Number of Leaders	Grade VII		Grade VIII		Grade IX		Boys' Total	Girls' Total	Grand Total
	Boys	Girls	Boys	Girls	Boys	Girls			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0 to 2	9	1	1	.....	5	1	15	2	17
3 to 5	4	5	1	.....	4	2	9	7	16
6 to 8	13	13	7	4	3	6	23	23	46
9 to 11	15	6	5	6	6	11	26	23	49
12 to 14	14	5	10	8	2	18	26	31	57
15 to 17	13	9	14	12	12	10	39	31	70
18 to 20	7	7	9	9	12	6	28	22	50
21 to 23	4	6	11	7	6	5	21	18	39
24 to 29	29	22	12	16	9	17	50	55	105
Total	108	74	70	62	59	76	237	212	449

not list twenty-five names this reason may be discounted. These results certainly raise a question as to whether biographical material is "getting across" to these pupils in sufficient quantity and with sufficient permanency. If all the pupils in this school had named twenty-five persons each, the lists would have numbered 11,225 names. In point of fact, the total number of names was 7,183. For this group of pupils the facts are self-evident. Of even greater significance is the fact that no one of the grades listed more than 355 different names. The pupils in this school are not familiar with any very considerable number of different persons. Whether or not it is desirable that they should be is a question of objectives, which cannot be answered by any such study as this.

The second table has to do with the character of the choices made. Here it must be remembered that the factor which determined the place where any particular individual should be placed was the answer given by the pupils to the "why" of the question-

TABLE II

DISTRIBUTION OF CHOICES BY CATEGORIES FOR GRADES VII, VIII, AND IX

Categories	Boys	Girls	Total
(1)	(2)	(3)	(4)
I. Home	1	3	4
Friends	1	1	2
Relatives	.....	2	2
II. Church	223	227	450
Organization	38	65	103
Human welfare	185	162	347
1. Philanthropists	33	43	76
2. Social workers	152	119	271
III. State	1,423	1,141	2,564
Political (civic)	773	796	1,569
Military	650	345	995
IV. Business	111	66	177
Industry	70	27	97
Commerce and finance	18	11	29
Professions	23	28	51
V. School	1,271	1,349	2,620
Organization	14	39	53
Arts	275	376	651
1. Painting	1	6	7
2. Music	107	117	224
3. Sculpture	3	.....	3
4. Literature	124	233	357
5. Drama	34	20	54
a) Legitimate	6	.....	6
b) Cinema	17	3	20
c) Vaudeville	.....	.....	.....
d) Debaters and orators	11	17	28
6. Dancing	6	.....	6
Physical education	93	81	174
Research	922	865	1,787
1. Scientists	99	141	240
2. Inventors	394	328	722
3. Discoverers	212	224	436
4. Explorers	155	130	285
5. Adventurers	62	42	104
VI. Personal factors	296	304	600
Moral	215	238	453
Intellectual	69	47	116
Social	12	19	31
Errors and omissions	68	54	122
Mythical characters	2	4	6
Total number of students	233	208	441

naire. This condition also determined the categories under which the listings were tabulated. After several types of classification were suggested and tried out, it was found that the reasons given by the pupils for considering individuals as leaders could be most satisfactorily grouped according to the categories used in Table II.

In reading or interpreting this table, care must be taken not to confuse the main headings, subheadings, and sub-subheadings. Only the results from the school as a whole are presented here, although a like tabulation has been made for each grade.

Turning to the table we find that four persons were mentioned who were considered by the pupils as leaders in home life; of this number two were classed as friends and two were classed as relatives. Church leaders were named 450 times; 103 of the choices were considered as leaders because of their affiliations in church organizations, 347 choices were made because of their contributions to human welfare, 76 because of philanthropy, and 271 because of contributions to social work. These figures do not indicate different individuals named but signify the total number of times all persons were named for any of the reasons tabulated. There are, of course, many duplicate listings. In this way only, did it seem possible to indicate total pupil-interest in any one or more of the categories. Ultimately, an index number was determined by the weight of the choices of the pupils.

The examination of these results presents several interesting sidelights on the problem of program-making. First, the comparatively small number who are named as leaders for their personal qualities may indicate that we are overemphasizing in our school work what persons do and underemphasizing what they are. When the pupils have reached the junior high school, they are old enough, mature enough, and experienced enough to sense real greatness as a subjective, as well as an objective, quality. Results procured from larger groups will doubtless throw more light on this point.

This limited study appears also to provide additional evidence of the similarity between the sexes in their choice of leaders. This is, in all probability, the result of instruction rather than of inherent sex differences. This similarity of choices made by boys and girls is emphasized by Table III which comprises the entire list of the names of the women mentioned by these pupils and the distribution of choices between boys and girls.

If the reader omits those names which are obviously local heroes, it is evident that the girls know only a few more women leaders than do the boys. The amazingly small total number of women who enter into the memories of children is a reflection of textbook influence, of a man-determined world, and of a weakness among teachers who fail to bring out the contributions of women to civilization. The evidence of this table would seem to show no excessive super-

TABLE III

List of Women Named

Names of Leaders	Grade VII		Grade VIII		Grade IX		Boys' Total	Girls' Total	Grand Total
	Boys	Girls	Boys	Girls	Boys	Girls			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jane Addams	1			1			1	1	2
Louisa Alcott		5		2		1		8	8
Priscilla Alden				2				2	2
Susan B. Anthony	1		2	2	1	4	4	6	10
Helen Aray	1						1		1
Jane Austen	1						1		1
Joan of Arc	1	5	1	4	1	7	3	16	19
Clara Barton			2	8			2	8	10
Bird-Woman				1				1	1
Phoebe Cary		1						1	1
Cleopatra						1		1	1
Mrs. Coolidge	1	1		2			1	3	4
George Eliot				1				1	1
Queen Elizabeth	4	3	3	5	4	5	11	13	24
Mrs. Ferguson	1		2	1	4	16	7	17	24
Barbara Frietchie				1				1	1
Miss Friedman		1						1	1
Mrs. Glenn		1						1	1
Alma Gluck		1						1	1
Miss Glover	1						1		1
Mrs. Harding				1				1	1
Julia Ward Howe	3			1	2	1	5	1	6
Anne Hutchinson			1				1		1
Queen Isabella	5	2	1	4		2	6	8	14
Mrs. Kahn			1	1			1	1	2
Helen Keller				1		1		2	2
Susanne Lenglen	1	1			3	2	4	3	7
Mrs. Lincoln				1				1	1
Mary Lyon		1			2	1	2	2	4
Mary, Queen of Scots		1	1	1			1	2	3
Florence Nightingale		1		7				8	8
Jeannette Parkens	1						1		1
Mary Pickford	2	1					2	1	3
Molly Pitcher		1						1	1
Pocahontas	1	1	2	1			3	2	5
Gene Stratton Porter						1		1	1
Maude Powell		1						1	1
Mary Roberts Rinehart						1		1	1
Mrs. Roosevelt				1				1	1
Betsy Ross	10	1	9	18	6	7	25	26	51
Miss Royals		1						1	1
Schumann-Heink					1		1		1
Sister Theresa	1	1					1	1	2
Harriet Beecher Stowe					2	4	2	4	6
Queen Victoria					1	1	1	1	2
Mrs. Waugh		1						1	1
Martha Washington		2	1	2			1	4	5
Anita Whitney			2				2		2
Kate Douglas Wiggin		1						1	1
Helen Wills		2			3	9	3	11	14
"Mother"		2						2	2
Totals	36	30	28	69	30	63	94	171	265

feminization of the pupils' ideas, ideals, or attitudes. In fact, girls should know more of the great women leaders in the world and not be confined so largely to those whose prominence rests upon their political or military relationships.

These results call attention once more to the influence of textbooks in emphasizing political and military characters. The distribution of choices between these two categories seems to indicate that emphasis has been somewhat shifted from war- to peace-time contributions. While we are accused of being a money-grabbing nation, it appears that the children in this school have not been so contaminated by this influence as to select any large proportion of leaders on the ground of their industrial, commercial, or professional enterprises.

The relatively limited choice of movie actors and actresses is rather unexpected. Is it because children do not look upon these persons as real; or is it because the movie characters do not fall within the child idea of leadership; or is it for some more childlike reason? If these results are any criteria it would seem that the cry of the terrible influence of the movies upon the character of children is an exaggeration. Further results may prove contradictory to the situation revealed in this school.

The decided choice of pioneers in the several fields is illuminating as indicative of what can be done by school influence. The junior high school embodies the concept of opening the doors of human knowledge and human activities. One means of doing this is by interesting the children in the pioneer efforts of man to understand and to conquer his world. That these efforts appeal to these pupils is evident from the comparatively large numbers of such pioneers who appeal to these children as leaders.

If it is possible to turn attention to the leaders of the arts in the fields of literature and music, is it not equally possible for our schools to direct children more abundantly to the fields of painting and of sculpture than these results show? Do our school programs provide sufficient information from these latter fields? Can we profitably enrich our curricula through the use of more of this cultural material?

This study is very incomplete and inconclusive. The students at work upon it have found it stimulating and suggestive. More extensive and more accurate investigations of this sort are needed that something constructive may result for program-making.

SEX DIFFERENCES IN ARMY ALPHA SCORES IN THE SECONDARY SCHOOL

GUY M. WHIPPLE[1]
Director of the National Intelligence Tests

IN a preceding article, I showed that the average scores of girls exceed the average scores of boys in tests of intelligence applied in the elementary school. In the present article, I call attention to the fact that when the Army Alpha test was released for civilian use and applied to pupils in the secondary school, a sex difference again appeared, but this time in the reverse direction—the average score of high-school boys exceeded the average score of high-school girls. The same result—superiority of men—likewise appears in Army-Alpha scores from normal schools and colleges.

Various explanations have been set forth for this outcome: in particular, it has been argued that less capable boys are more apt to leave the high school than are less capable girls, so that the difference simply reveals the existence and the amount of this selective agency. And again, it has been argued that the content of Army Alpha, originally designed as it was for use in the army, naturally favored the male sex, both in its inherent appeal and in its subject-matter. As I have never seen any serious attempt to analyze this situation, and as it holds a certain amount of theoretical interest, it occurred to me to make use of an opportunity to study the scores of this test in detail.

THE SUBJECTS

In connection with the survey of the schools of Flint, Michigan, mentioned in the preceding article, I personally administered Form 6 of the Army Alpha test to all the Freshmen and all the Seniors in the Flint High School.

The available material consisted of the original test blanks obtained from 290 Seniors (129 boys and 161 girls) and 544 Freshmen (227 boys and 317 girls).

THE METHOD

The method of analyzing this material was simply to make numerical and graphic distributions of the scores of each of these four groups for each of the eight tests of Army Alpha, and, of

[1] With the assistance of Mrs. E. G. Tefft, graduate student, University of Michigan.

course, for the total score of the examination. For those tests in which sex difference appeared, a further analysis was then made to discover the percents of boys and of girls whose responses for each item within the test were right, wrong, or omitted. As a further check, the probable error of the difference between the medians of the two sexes was calculated whenever the difference warranted this procedure.

TABLE I

MEDIAN ARMY ALPHA SCORES FOR HIGH-SCHOOL FRESHMEN AND SENIORS AT FLINT

TEST	FRESHMEN		SENIORS	
	227 Boys	317 Girls	129 Boys	161 Girls
(1)	(2)	(3)	(4)	(5)
Directions	7.23	7.03	9.02	8.02
Arithmetic	10.35	8.95	11.90	9.89
Practical judgment	9.46	9.34	10.94	10.26
Synonym-antonym	14.77	14.97	19.25	19.38
Disarranged sentences	12.88	12.42	16.21	15.85
Number series	9.73	8.94	10.80	9.92
Analogies	16.70	17.35	20.83	20.95
Information	19.83	16.98	28.44	21.79
Total score	96.53	89.17	121.32	110.93

THE RESULTS

In presenting the significant results of this treatment, I shall neglect the details of the various graphic distributions that were made. Inspection of the median scores, given in Table I, will show at once that a definite sex difference appears in the total score, but that, while this difference appears in certain ones of the eight tests, it is absent in others.

To show clearly which ones of these sex differences are significant, we have listed the differences for the two classes in each of the eight tests of Army Alpha, together with the probable error of each difference[2] in Table II. It is tempting to conclude that the girls excel in the two clearly linguistic tests (Test 4, Synonym-Antonym, and Test 7, Analogies) where the boys' excess is minus for both classes, but the difference between the medians is hardly more than

[2] The probable error of the several medians was found by the formula $PE = \frac{Q_3 - Q_1}{2}$. The PE of the differences between the medians was found by the formula $PE_{Dif.} = \sqrt{\frac{PE_1^2}{n_1} + \frac{PE_2^2}{n_2}}$

its probable error in any of the four cases; that is, there may be such a superiority for the girls, but our cases are not enough to prove it. Of the remaining six tests, in which the boys' medians exceed the girls', three (Test 1, Test 3, and Test 5) may be thrown out of consideration if our criterion is a difference between medians, in *both* groups, at least four times as large as the probable error of the dif'erence.

This leaves us with three tests—Test 2, Arithmetic; Test 6, Number Series; and Test 8, Information—in which there is a reliable sex difference. In each of the three this difference is in favor of a higher score for the boys.

TABLE II

POINTS OF SCORE BY WHICH BOYS' MEDIANS EXCEED GIRLS' MEDIANS AND THE PROBABLE ERRORS OF THESE DIFFERENCES

TEST	FRESHMEN		SENIORS	
	Boys' Excess	P. E.	Boys' Excess	P. E.
(1)	(2)	(3)	(4)	(5)
Directions	0.20	.14	1.00	.20
Arithmetic	1.40	.15	2.01	.20
Practical judgment	0.12	.12	0.68	.18
Synonym-antonym	−0.20	.39	−0.13	.50
Disarranged sentences	0.46	.21	0.36	.34
Number series	0.79	.19	0.88	.18
Analogies	−0.65	.49	−0.12	.69
Information	2.85	.35	6.65	.51
Total score	7.36	1.44	10.39	2.02

Sex difference in arithmetic and number series.—At present, I am not prepared to offer any complete analysis of the nature of the superiority presented by the boys in Arithmetic and Number Series. It seems plausible to link these two tests together, as they both deal with numerical relationships, and to declare that high-school boys, whether Freshmen or Seniors, have a somewhat greater facility than high-school girls in dealing with arithmetical problems. I mean by this that it seems scarcely probable that the actual detailed content of these two tests is in itself responsible for the sex difference, although just that assertion has been made. Thus, for instance, it seems to me psychologically quite improbable that Example 9 in Test 2, "If you buy 2 packages of tobacco at 8 cents each and a pipe for 55 cents, how much change should you get from a two-dollar bill?" favors the male sex, but would be made to favor the

fairer sex by substituting needles for tobacco and a ribbon for a pipe! Certainly, in the case of Number Series, the content is as near sexless as one could contrive.[3]

Sex difference in information.—This brings us to Test 8, Information, for the main source of the sex difference in Army Alpha scores in the high school. This test consists of 40 items, running from "Boston is in Connecticut, Rhode Island, Maine, Massachusetts" to "An eight-sided figure is called a trapezium, scholium, parallelogram, octagon."

In order to determine why boys excel so decidedly in this test, we proceed to analyze the responses in such a way as to discover which of these 40 items, if any, conspicuously favor the boys, because it may be that the entire explanation for the curious reversal of sex superiority in intelligence scores in the secondary school as compared with the elementary school, which we know is mainly due to this Information Test, lies in the predominantly masculine content of the test.

In attempting this analysis of the responses, however, we encounter a difficulty occasioned by the failure of the examinees to follow the instruction: "If you cannot be sure, guess." In other words, there is a noticeable tendency not to respond at all to items that the examinee thinks he cannot answer correctly.

The items most frequently omitted by senior boys deal with *Arthur Brisbane, Country Gentlemen, Rodin, chameleon, thyroid, madras, The Scarlet Letter, John Wesley, Falstaff,* and the number of legs possessed by a *Korean!* Senior girls, however, frequently omitted the same items and also items dealing with *artichoke, cutlass, Corona typewriter, Delco system,* the *source of rubber,* and *Darwin.*

The task of analysis might conceivably be made difficult by another feature. Since the girls' score is lower than that of the boys, it might be supposed that they work more slowly and attempted fewer items. This difficulty, however, is entirely taken care of by the conditions under which Test 8 is administered: the time-limit, 4 minutes, is long enough to permit practically every pupil to finish before the command to stop. That this is true is

[3] I have sought in vain to discover from those concerned in applying educational tests in the junior and senior high school for reliable data on the relative achievements of the sexes in arithmetical problems or arithmetical computation. The opinion seems to prevail—but it is only an opinion—that boys slightly surpass girls in schoolroom tests in these subjects at this period of their schooling.

demonstrated by the fact that in the senior group the median number of items attempted by the two sexes differs by only 2 points and in the freshmen group, by substantially zero.

Consequently, it appears that a just comparison of the sexes may be obtained by considering simply the number of times each item is marked right by each sex. The results of such a comparison

TABLE III

INFORMATION TEST—EXCESS PERCENT RIGHT FOR BOYS (SENIORS AND FRESHMEN COMBINED) FOR EACH OF THE 40 ITEMS

Item No.	Topic	Excess Percent	Item No.	Topic	Excess Percent
(1)	(2)	(3)	(1)	(2)	(3)
5	Turquoise	−22.5	39	German Allies	11.0
26	Scarlet Letter	−12.0	18	Thyroid	11.5
9	Blanche Sweet	− 6.0	13	Yale University	12.0
23	Indigo	− 6.0	14	Tokio	14.0
25	Madras	0.0	40	Eight-Sided Fig	14.0
1	Boston	0.5	24	Xylophone	14.5
27	John Wesley	1.5	33	Perjury	15.5
15	Diamonds	2.5	21	Cutlass	16.0
6	Leghorn	3.5	12	Artichoke	16.5
11	Country Gentleman	4.0	35	Slice	17.0
8	Shoes	5.5	30	Darwin	17.5
16	Rodin	6.0	32	Korean	18.5
31	Falstaff	6.5	34	Tedder	20.0
3	Arabian	7.0	20	U. S. S. Michigan	21.5
19	Dioxygen	7.5	36	Lexington	22.0
38	Buick	8.0	22	Corona	22.5
2	Euchre	8.5	37	Kilowatt	25.0
7	Brisbane	8.5	10	"Makings"	29.0
17	Chameleon	9.0	4	Milwaukee	37.5
29	Rubber	10.5	28	Delco	40.0

are placed before you in Table III. The method by which this table has been prepared may be illustrated by reference to Item 39, dealing with the German allies (top of the second column). For this item 32 percent of freshmen boys and 48 percent of senior boys answered correctly; hence the average percent of the boys of the two classes is 40. Similarly, 27 percent of the freshmen girls and 31 percent of the senior girls answered this item correctly; hence, the average percent for the girls of the two classes is 29. Comparing, then, the two sexes, the difference between 40 and 29 is 11, and the boys are therefore credited with an excess percent

of 11 with respect to this item.[4] The forty items are arranged in Table III in the order of the boys' advantage; it is least (minus, in fact) for turquoise, greatest for Delco.

INTERPRETATION

In considering this outcome many of the sex differences would doubtless be anticipated; girls would be expected to be more likely than boys to know the color of turquoise; boys would be expected to be more likely than girls to know that Delco is an ignition system. Other items—for example, Boston, John Wesley, diamonds—may be disposed of as revealing a sex difference too small to be significant. And you may be disposed to declare that this list as a whole very definitely appeals more strongly to the interests of the male than to those of the female. However, it still remains, in my judgment, difficult to explain why more boys than girls know the date of the Battle of Lexington, or the location of Tokio or why Darwin was famous, or that a Korean is a biped! And perhaps equally surprising that just as many of them know that madras is a fabic. In my judgment, after making due allowance for "sex-loading" in content, we are forced to conclude that not all the superiority of the boys is accounted for by the choice of items in this test.

As to how the residual superiority (after due allowance has been made for the selection of topics in Test 8 favoring the male) can be explained, there seem to me these possible suppositions: (1) It can be supposed that the boys and girls really possess identical intelligence, but that boys exhibit a wider range of general interest—perhaps do more general reading—so that their stock of general information covers a wider range of topics that are not specifically male or female in their bearing or contacts. (2) It can be supposed that the high school tends to retain in its classes relatively more girls of poorer intellectuality than boys of poorer intellectuality,[5] in which case the sex difference revealed in Army Alpha is a true difference—the boys as a group really are superior to the girls as a

[4] It would be easy to criticize this method, but while perhaps not the best, it is the simplest one I could use with the data before me. If the two classes are taken separately, there will be some alterations in the arrangement of this list, but they will be comparatively unimportant. It does not seem feasible to get behind the responses and attempt to estimate which cases of omission are bona fide omissions and which are practically admissions of ignorance. The comparison here given is as fair for one sex as for the other.

[5] That *more* girls than boys are retained is well known; in Table I, for instance, the proportion of girls to boys far exceeds that obtaining in the elementary school. It is a fair presumption that those who drop out are preponderantly those who are not succeeding.

group. In confirmation of this supposition, we may cite the fact, already mentioned, that boys excel definitely in three tests in this intelligence examination, and we may mention the further fact—which I have not space now to elaborate—that when the scores of Seniors are compared with the scores of Freshmen, test by test, the boys improve more than the girls do in seven of the eight tests. The exception is in Test 5, in which the improvement of the two sexes is virtually identical—0.1 point in favor of the girls.

SUMMARY

So far, then, as this analysis can take us, we may say that there is found a real sex difference in scores obtained on the Army Alpha examination given in the high school. This difference favors the boys and appears both in the freshmen and senior classes. The advantage of boys is unquestioned in the arithmetic test, the number-series test, and the information test. The advantage of boys in the arithmetical tests cannot be attributed to the selection in these tests of items favoring their sex. The advantage of boys in the information test, which accounts for the major portion of the total sex difference in score, may be partially accounted for by the selection in this test of items that favor their sex, but it cannot be wholly accounted for by such selection.

For a final explanation of the residual sex difference in these test scores, we are led to assert that high-school boys as a group are really slightly superior intellectually to high-school girls as a group. Whether this slight superiority may itself be entirely explained by the selective influence of the high school is a matter for further investigation. That is at least a reasonable hypothesis. It would be worth while to make a similar analysis of the performance of the sexes in other high-school intelligence tests and in various tests of educational attainment.

DAYDREAMS: A CAUSE OF MIND WANDERING AND INFERIOR SCHOLARSHIP

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INVESTIGATIONS have brought to light a number of reasons for the inferior work done by many students. The most important of these reasons are lack of intelligence, laziness, working for room and board, lack of exercise, and mind wandering or failure to concentrate. Although many teachers maintain that mind wandering is the most frequent cause of poor scholarship, they have little definite information with which to support their belief. The problem of mind wandering, in fact, is commonly dismissed with the explanation that it is simply a manifestation of lack of interest, without explaining the reason for the lack of interest.

For some time the writer has been investigating the problem of mind wandering at the Northern State Normal School in order to discover its prevalence and nature, and, if possible, the methods of controlling it. Approximately 50 percent of the 250 students questioned give mind wandering as a major hindrance to study. Some of them reported that they were able to control it reasonably well, but others stated that because of mind wandering they devoted only from 25 percent to 75 percent of a study period to actual study. That is, judging their efficiency from the standpoint of concentration, they are only from 25 percent to 75 percent efficient. Such a condition clearly presents a problem for serious consideration.

The most frequent cause of mind wandering was found to be daydreaming, and not a drifting of the mind to other studies or to anything else of a serious nature. This fact logically led us to inquire into the subject-matter of daydreams for the purpose of discovering this field of mental activity which is so alluring that many students neglect their studies in order to indulge in it. Before discussing this phase, however, the nature of daydreams in general will be considered.

Daydreams must be carefully distinguished from desire and planning. Desire may be regarded as an impulse directed toward the attainment of an objective or end, and it implies action or effort in a certain direction. Planning, which refers to the method of action, takes into consideration the end sought and the ability and resources of the person who is to act. Daydreams, on the other

hand, involve none of these conditions. Although there must always be an object or situation around which the daydream centers, there is no action or impulse directed toward its attainment and, consequently, no planning or method of approach involved. The daydreamer is satisfied with the pleasure which he derives from the dream and makes no attempt to realize the situation imaged in it. These points of distinction are essential to a discussion of the subject.

Daydreams possess two characteristics which make them attractive to the dreamer and at the same time difficult to control or prevent. In the first place, most of them are delightfully pleasant, with the dreamer receiving the attention or plaudits of admirers. The dreamer is what he would like to be and is, for the present, entirely satisfied with himself. Secondly, daydreams are, as Green puts it, "so fatally easy." They afford a high degree of pleasure and require but a minimum of effort.

The subject-matter of daydreams varies widely, but it may be classified roughly into three kinds, namely, love affairs, athletic activities, and professional accomplishments. Almost one-half of the daydreams written by one hundred and fifty students belong to the first kind. Examples of the three kinds are given below.

The first is the love daydream of a young man.

Many of my daydreams center around a certain young woman and myself. Probably this is because I almost idolize her.

I sometimes drift off into a daydream, imagining that I have a nice blue four-passenger Wills-St. Claire coupé, and we do a lot of driving after school. Then, when the Spring Term is over, we spend our summer vacation camping together. One day she went to a cottage across the bay and on her way back got entrapped by forest fires. I just happened along and did a little rescue work, but also got seriously burned. However, I carried her back to our cottage and then dropped unconscious. When I "came to" she was bandaging my arms, which were badly burned.

Even though I was badly burned in the daydream, I received a great deal of pleasure from it.

The next example represents a type very common among young men, whether or not they are athletes. The young man who wrote this daydream does not participate in athletics, but he enjoys watching all kinds of sports.

The scene of the daydream is laid at the Polo Grounds in New York City. The annual world series is in progress. Thousands of people pack the bleachers and grand stands, and as we enter the field we receive a great ovation. This game is the final and determining one of the series. Then the game begins.

As it progresses, it grows more and more exciting, and every one believes that it will run into extra innings. In the eighth inning, the "heavy end" of the opponent's team is at bat, and the first man up hits a sizzling liner which looked good for a double. After a mighty run, I made a spectacular stop and held the runner at first base. The next man fanned. Then came a long sacrifice fly which advanced the runner to second. The next man hit a liner which I stopped with much difficulty; I then made a pretty "peg" to the home plate and caught the runner there. The fans were now in an uproar and shouting for our team. The first man singled, and was sacrificed to second. Then I came to bat, and made a neat single which won the game. The crowd thronged the field in an effort to show its appreciation. After a short time, we made our way through the crowd and prepared for a big reception in our honor.

At this point, my roommate aroused me from my reverie and didn't even ask who won the game, but informed me that it was time to start work.

This last daydream was written by a young woman who is specializing in music—when her daydreams permit.

In my daydreams, my mind wanders off to a large city like Chicago or New York. There I am a professional pianist. My playing brings me an enormous sum of money, and with a part of this I provide myself with a very expensive and gorgeous wardrobe.

I am noted for my playing and I realize it because of the great applause I receive from my audiences. I am usually requested to play my selections twice, so well is the audience pleased with my interpretation. I broadcast my playing all over the world and receive invitations to play in foreign cities, especially Paris.

Then I arouse from my daydreams and realize that I am only a student preparing to become a teacher of music in the public schools.

Daydreams chiefly interfere with study in two ways. The first and less important is that they occupy the time which should be devoted to serious work. If a student spends from 25 percent to 75 percent of his study period in daydreaming, he is throwing away that much time for study. A study period of an hour accordingly becomes any amount of time between fifteen and forty-five minutes. When an hour is necessary for the preparation of a lesson, it is clear that the student's work will be inferior if he devotes considerably less than this amount of time to the work.

The second hindrance is that daydreaming leaves the mind unfit for serious study. A person who becomes accustomed to doing only easy, pleasant things is very likely to find anything disagreeable which requires effort and, accordingly, to lack interest in it. A number of students have admitted that after spending some time in daydreaming, they find study uninteresting and difficult. Ex-

cessive daydreaming, in other words, results in a sort of mental flabbiness which is a positive hindrance to scholarship.

The control of daydreaming within reasonable limits seems to be a difficult problem. One method, and possibly the most effective, is to explain to students the nature of daydreaming and its bad effects. I have found that very few students were aware of their daydreaming until they were questioned about it. They seemed to feel that their mind wandering was a necessary evil, caused by the nature of the subjects which they were attempting to master. Many students have testified, however, that after they understood the nature of daydreaming, they could control it much better. As one student put it, "When a person sees what daydreaming really is and how foolish it is, he can control his mind much better."

Another method of control is to discourage so much reading of popular literature by the students. Investigators of daydreaming have pointed out that most of the popular literature, whether in books, magazines, or music, is largely an expression of daydreams. Indulgence in this sort of reading-matter consequently stimulates the reader to more daydreaming. Some students state that their daydreams are modeled after characters which they have read about in light fiction, or have seen portrayed upon the screen.

Finally, teachers may aid students in concentration by assigning all the work which the students may reasonably be expected to do, and by requiring that it be prepared satisfactorily. The student who feels that he must get his work from day to day is not likely to spend his time in daydreaming. The pressure of necessity will assist him in keeping his mind upon his work.

THE CONTRIBUTION OF JOHN DANIEL RUNKLE TO AMERICAN EDUCATION

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FIFTY years have passed since the slogan "Instruction and Not Construction" was heard in certain engineering circles over the country and was occasionally used in the reports of state commissioners of education. To most laymen and to the rank and file of educators it meant nothing. To those, however, who were aware of the increasing demand for a more practical education, it epitomized a new method of shop instruction in harmony with the prevailing educational creed of the past century. John Daniel Runkle, president of the Massachusetts Institute of Technology, it is well known, was the educator who coined the slogan and put it into circulation.

The opportunity for expanding the doctrine of formal discipline, employed by his academic colleagues, was indirectly afforded President Runkle by the passage of the Federal Land Grant Act of 1862. Shortly after its enactment, commissioners were appointed by the Legislature of Massachusetts to select the lands. Since there were no state colleges in Massachusetts, the Legislature designated the Massachusetts Institute of Technology, in Boston, to receive the income fund from the sale of the public domain. President Runkle, who was very anxious to discover some method of instruction that would conform to the spirit and letter of the federal statute, visited the Philadelphia Centennial of 1876 "in an expectant and hopeful frame of mind."[1] Educational interests were, without doubt, notoriously slighted at this great exposition.[2] Nevertheless, while groping about on the dark stairway landings to which school exhibits were assigned by the officials, President Runkle discovered a small case containing three series of carefully graded models—one of chipping and filing, one of forging, and one of machine-tool work.[3] Through the exposition of the educational significance

[1] Runkle, J. D. "Origin of Mechanic Arts Teaching," *Conference on Manual Training*. Boston, 1891. p. 134.

[2] Smith, Walter. "Report on Drawing," *Report of Massachusetts Board of Education*, 1875-76. p. 42.

[3] Runkle, J. D. "Letter of," published in *Manual Training: the Solution of Social and Industrial Problems*, by H. C. Ham. New York, Harper and Sons, 1886. pp. 331-32.

attached to the contents of this small case, President Runkle gained fame as an educational innovator.

But few copies of the little pamphlet, prepared in the form of a report to the Corporation of the Institute of Technology, and describing the tool work seen by President Runkle at the Centennial, are extant today. The report mainly consists of a detailed account of the work done by pupils in the Imperial Technical Schools of Russia and of a recital of the attempts made by Della Voss, director of the Imperial Technical School, of Moscow, to solve the "economy-of-time" problem in manual education.[4] The emphasis on methods of classroom procedure, as exemplified in the shop-work exhibit, is one outstanding feature of this report. But scant mention is made, however, of the disciplinary value per se of the "new departure in manual education." The report recommends that the Institute's course in manual education be completed by the addition of a series of shops. Concerning these, President Runkle, writing in 1884, said:

> My first work at the Institute was to build up a series of Mechanic Arts Shops or laboratories, in which to teach these arts, just as we teach chemistry and physics by the same means. At the same time I believed that the discipline could be made a part of general education, just as we made the sciences available for the same and through laboratory instruction.[5]

This pronouncement was made several years after Calvin Woodward had developed the theory of manual training as a disciplinary subject. Nevertheless, strong evidence exists to prove that when Runkle first emphasized instruction, and not construction, as the goal of the Russian system, he was thinking of manual training in like terms. In an interesting, but fruitless, debate over a proposed developing of school and school shops for Boston, which attracted considerable attention in the Press, he is quoted as saying, "I don't care if the student never touches a tool after he leaves the school. The course is justifiable simply on the ground of the discipline it gives."[6] Moreover, in 1880, Woodward referred to Runkle as "the man to whom, more than any other, the cause of manual education in America is indebted; for he looked deeper into the problem than

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[4] Runkle, J. D. *The Russian System of Shopwork Instruction for Engineers and Machinists.* Boston, Rockwell and Churchill. 1876.

[5] Ham, C. H. *Manual Training.* p. 332.

[6] Committee Report, American Social Science Association, *Report on a Developing School and School Shops.* Boston, Rockwell and Churchill, 1877. p. 18.

had Della Voss and saw that shop instruction, essential to a mechanical engineer, has elements of value in a general education."[7]

Woodward's enthusiasm was undoubtedly engendered by his reading an article of Runkle's that was published during the late seventies in a Massachusetts State Board of Education report.[8] Because this document recapitulates the material contained in the several papers written by President Runkle, a short quotation from it is justified here. After a somewhat long and involved introduction, two questions are propounded and their answers given as follows:

1. On what ground can we justify the introduction of the manual element into our system of public education?
   Solely on the broad ground of its educational value to all. . . . . the advocates of the introduction of Drawing (Manual Training) must then show that the subject is either intrinsically educational or can be made so by the method of teaching it. . . . . The manual element must be taught by such methods as will cultivate the other powers through the acquisition of manual skill.
2. Have we found a method of teaching the mechanic arts, both theoretically and practically, similar to those used in teaching the sciences and other purely mental subjects?
   The Imperial Technical School of Moscow was the first to show that it is best to teach an art before attempting to apply it; that the mechanic arts can be taught to a class through a graded series of exercises by the usual laboratory methods. . . . . Making the art and not the trade fundamental, and then teaching the art by a purely educational method (Instruction and not Construction) is the Russian system. . . . . This method constitutes the only true and philosophical key to all industrial education.

This, then, was the contribution of the man whom Charles Ham, in the oldest memorial of the epoch immediately preceding the phenomenal spread of the manual-training high school, eulogized as the "Father of Manual Training," the man who discovered that a series of carefully graded abstract exercises lending themselves to demonstration before a class could be grafted upon the existing system of education without violating the mandates of the doctrine of formal discipline. Runkle's fame did not rise from the work of

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[7] Woodward, C. M. *The Manual Training School.* Boston, D. C. Heath Company, 1887. p. 4.

[8] Runkle, J. D. "The Manual Element in Education," *Report of Massachusetts State Board of Education, 1876-77,* pp. 187-89.

his short-lived school, nor from his participation in the great manual-training movement which followed in the wake of the educational conventions of the early eighties. His fame rested solely upon his expansion of a pure educational fiction—a notion that the performance of set tasks in one field of education gave to the individual, powers extending far beyond the field of the tasks themselves. and that transfer of training was universal. With the partial eclipse of the doctrine of formal discipline, manual education as conceived by Runkle, and more fully realized by Woodward, passed into oblivion.

EDITORIALS

THE SCHOLARSHIP OF COLLEGE STUDENTS

Among university professors no opinion is more unanimously entertained than the belief that the scholarship of students is of a low order. Many a ponderous pleasantry, many an ingenious turn of phrase is found in professorial writings wherein the college student is made the butt of academic ridicule. Students are stupid to begin with and poorly prepared besides. No capacity is more evident, if you can believe these Jeremiahs, than the capacity of the student mind to resist penetration. Moreover, the high school is an institution vaguely thought of as preparing students for college and of doing the job very badly.

The present is always the worst of times—except that the future looks even gloomier. Those who dilate upon student depravity must perforce regard the old days as better days, for were they not students themselves a little while ago? The disconcerting thought here is that the professors of their student days used the same language which they themselves now employ.

The college professor is uncharitable in his judgment of the ability of students. When their interest is aroused, they betray what even he would characterize as symptoms of intelligence. Conceivably the attitude and the attainment of these young people would be more satisfactory if they were better taught. Not a few students have been better taught in high school than in college. This will remain true in a large number of cases until the burning question of the under-classman, especially the Freshman, has been squarely met and fairly solved. As long as departmental arrangements provide mere assistants and instructors to teach the Freshmen and Sophomores one may easily find more appropriate targets for witticism than the shortcomings of under-classmen.

This is scarcely the place to set forth with any fullness the means by which high-grade men may be put in charge of introductory courses, but having raised the question we feel little disposed to run away from it. Obviously, with a limited amount of money the high-grade man—who is also highly paid—cannot teach introductory courses unless the classes are large. Many college professors have

a rooted aversion to large classes. The evidence, however, is all against them. Anyone who examines the available information on the subject must admit that efficient instruction can be given to large groups of students. Whether more efficient instruction can be given to small groups of students is scarcely the point since the evidence shows that such superior instruction is not in reality afforded. Moreover, the issue is not between equally capable teachers in large and small classes. It is between the high-grade man teaching a large class and the tyro teaching a small class. When such an alternative is offered to students, they unanimously choose the high-grade man without reference to the number of students in his class. If Professor A is a man of outstanding ability and Instructor B is but a year or two removed from his baccalaureate degree, students will prefer Professor A no matter how large his classes are. Let the money which would be used to employ cheap teaching talent be used to secure high-grade clerical service—service of a distinctly professional character, service to be performed by persons of the rank of assistant or instructor. Let some such device as the daily written quiz be employed. The clerical service to which we are referring may easily be utilized not only to rate papers, but also to assist in preparing questions. If a double-entry score sheet is used in reporting to the professor in charge, he can obtain more definite and reliable information concerning each person in his class and concerning each topic which he has taught than can ordinarily be obtained by the oral method of quizzing in a small class.

But this is a diversion induced by the idea of putting good teachers in charge of introductory courses. What we started to say was that part of the reason why students do not evince more mental alertness and a greater mastery of subject-matter is because most college departments—there are notable exceptions—are merely playing with the question of teaching Freshmen and Sophomores.

Another question which we ought to ask ourselves is whether we are really encouraging scholarship in our educational institutions. Students are no longer promoted in the elementary school as the result of furnishing definite evidence of attainment. They are advanced on the judgment of the teacher. In the high school and college we rather generally require evidence in the form of written examinations, but we are careful to give these examinations at the earliest possible moment after the subject has been taught and studied. Students are no longer admitted to college by examination. They are admitted by certificate. They have to present

nothing to the college authorities as evidence of attainment. The evidence is certain formal data concerning the high school itself, its building equipment, financial condition, and teaching staff, which have induced some accrediting body to place the stamp of approval upon the particular school. If a student is a graduate of such a school, his admission to college may not be questioned.

As has already been indicated, the evidence which we secure from a student as to his proficiency is based upon immediate recall. It is as if we should send him to a telephone book to find the call number of Jones and Robinson, hardware dealers. We then ask him what the number is and upon his giving us a satisfactory reply we assume that he has learned the number as a permanent possession. This is practically what we are doing with our present system of examinations. It would be far better if we gave examinations a half-year, or a year, after the subject in question had been studied.

The truth is that at no point in our educational machine is there a premium upon retention. Students learn for the purpose of immediate reproduction. When they have passed a subject, they are no longer interested in it. Why should they be? They have given all the evidence which the institution requires, and they may be forgiven if they turn themselves to other matters.

One of the well-established facts in learning is that the permanency of retention is largely conditioned by the purpose to retain at the time of the initial learning. The reason why we do not remember a telephone number is because we do not try to learn it for more than momentary use. The reason students do not remember their French, or their chemistry, or their mathematics is because no one expects them to remember them beyond the time of examination and because the students therefore point their learning toward reproduction at a definite date.

Accordingly, when we say that the scholarship of the modern college student is weak, or even negligible, let us seriously consider, first, whether the accusation is true in any new or unfavorable way and, second, whether there is any charge to be laid at our door. In particular, let us take up with something more than academic prejudice the question of guiding and teaching the under-classman. Then let us be sure that we are doing all we can to set up an ideal of scholarship and a purpose to make the knowledge, appreciation, scholarship, and power of thought which the student may acquire from our teaching, a permanent, personal possession.

B. R. B.

NEWS and COMMUNICATIONS

Bulletin No. 14 of the National Association of Secondary Principals is devoted to abstracts of books and articles in the field of secondary-school administration. The books all represent publications of 1926, and the magazines are October and November issues.

The Educational Record (Volume 8, No. 1), published by the American Council on Education, contains the report of a committee on "Standard Terminology in Education." The committee is endeavoring to ascertain the best current use of a large number of terms which have not always been used with the same connotation.

The *Baltimore Bulletin of Education* for January contains an editorial on teachers' marks written by Assistant Superintendent John Coulbourn. We most heartily indorse the sentiment expressed in the following quotation: "Schools and teachers cannot educate by failures; neither can they prepare their pupils for worthy citizenship by failures."

Grade IV in a Massachusetts village school has a "Golden Book" in which is written a composition developed by the members of the class on any act of good citizenship in which a child distinguishes himself. It was begun as a result of one member seeking to protect another from punishment in the case of an accident after the class had studied the poem "Abou Ben Adhem."

Instructional Activities in the University High School, a recent "Educational Research Circular" prepared by the members of the Bureau of Educational Research, at the University of Illinois, contains brief articles on the following topics: "A Representative Assembly," "The Book Club," "Developmental Recitation in General Science," "An Experiment in Teaching of English Literature," "Timed Tests as a Method of Drill in Algebra," and "A Mathematics Assembly."

In the January issue of the *Chicago Principals' Club Reporter* is presented a considerable amount of material in the form of tables and graphs which have been used in the request for the adjustment of salaries. The proposed schedule which is now being considered by the board calls for salaries of $4,000 to $6,500 for elementary principals; $4,250 to $6,500 for junior high-school principals; and $5,000 to $7,500 for high-school principals.

The December number of the "University Review," issued by the Division of Educational Reference of Purdue University, Indiana, brings together a

most significant summary of current literature in higher education. Personally, it would seem that either there should be provision made for this type of work in all other institutions or some scheme should be arranged by which this work that is being done at Purdue might be made available to the members of the staffs at other schools.

The American Book Company has recently published three volumes in their "Journey Club Travels Series" which ought to be of great interest to children in intermediate grades. *The Houses We Live In, The Foods We Eat,* and *The Clothes We Wear* are the titles of these volumes which are excellently illustrated. A perusal of these little books would greatly extend the information of the average adult on these topics.

The first issue of the *University of Kansas Bulletin of Education* appeared under the date, December, 1926. This bulletin, which is published by the Bureau of Educational Service and Research, will be issued bi-monthly. We welcome this new periodical to the field of educational literature and are glad to note that the first issue looks well and contains a full measure of research material. The articles are reviews of Masters' theses.

Spelling Games is the title of a book published by the Beckley-Cardy Company, of Chicago. A large number of games have been collected which it is possible to use in connection with the spelling work. To what extent such games actually contribute to increased spelling efficiency is not revealed. It is evident from the suggested lists of words given with the games that no consideration has been given to the studies that have been made in the field of spelling vocabulary.

We have recently received the 1926 report of the superintendent of schools of Superior, Wisconsin. It is a 200-page report, approximately half of which is devoted to extra-curricular activities and the program of tests and measurements. The testing program covers an extensive series of intelligence and achievement tests ranging through all grades from first grade through the senior high school.

Superintendent Paul Dillingham, of Falmouth, Massachusetts, lists twenty-one accomplishments during the year 1926. Among these are: employment of a full-time supervisor of health, the organization of a community orchestra, the introduction in the primary grades of the three-track system, the extension of the physical-education program as a community service, the organization of a chapter of the Sportsmanship Brotherhood, and the initiation of an annual school exhibit.

Professor R. Duthil has recently published through the Societé d'Impression Typographiques, of Nancy, a French edition of the Otis Self-administering Tests of Mental Ability. Tentative norms for French children have been established, and the American norms are given for comparison. M. Duthil is a

leader in the testing movement in France and has been active in keeping the progress of the American testing movement before French readers. Pressey's *Introduction to the Use of Standard Tests* has been translated into the French by M. Duthil.

A new system of grading has been developed by the faculty of Maine Township High School, Des Plaines, Illinois, by which students who receive near-failing grades receive less than unit credit and those near the highest grade more than unit credit. Each grade is computed by the usual method and is then divided by the median grade of the class. By this scheme the average student receives a grade of 100, and the figures immediately reveal for each student whether his grade is above or below the average of his group.

Examining and Testing is the title of a recent issue of the "Bulletin of San José State Teachers College" (Vol. VI, No. I, January, 1927). The topics discussed are "How to Examine Effectively a Brief Testing Program in Reading with Selection and Use of Standardized Tests," "Tests for the Pre-School Child," and "The Statistical Treatment of Test Scores." The bulletin has thirty pages only, but through the use of small type an unusually large amount of material has been compressed within these pages.

A comparative study of the marks given by departments in the Kansas State Teachers College, at Emporia, has recently been reported in a mimeographed bulletin. The percent of A's for the first semester of the current year varied from 3 in teacher training to 24 in mathematics. The number of failures varied from zero in Latin and manual arts to 17 in English. During the second semester of 1925-26 the number of A grades varied from 3 percent in agriculture to 22 in physics, while the number of failures extended from 1 percent in Latin, home economics, and sociology to 14 in English. In one department the sum of A and B grades was greater than the sum of the A's, B's and C's in another department.

We have recently received a complete set of the Gates Primary Reading Test for Grades I and II and Gates Silent Reading Test for Grades III to VIII, which was published last year by the Bureau of Publications, Teachers College, Columbia University. The primary tests consist of two different types of which there are two forms. The silent reading tests consist of two forms each of four types: reading to appreciate general significance, reading to predict the outcome of given events, reading to understand precise directions, and reading to note details. A complete manual of directions for giving and scoring, together with age and grade averages, is given for each test.

M. Henri Goy, head of the Scientific Information Office of the University of Paris, Sorbonne, has sent us an announcement of French summer courses at the Sorbonne. These courses are properly a short school whose organization includes board and lodging in French families and pensions, theoretical studies

of the French language and civilization, and practical application of the instruction through conducted visits and tours. The course will continue from July 9, when the students arrive in Paris, until August 28 at the close of the two-week academic tour. During this tour students will be arranged in small groups under the teaching care of Professors Agrèges of the University. The total cost for these courses ranges from $270 to $455. Application and initial payment should reach Mr. Goy before May 15.

Arithmetic in the Rural and Village Schools of New York State is the title of a recent issue of the "Bulletin of the University of the State of New York." It is written by Jacob S. Orleans, research associate in the Educational Measurements Bureau, and F. Eugene Seymour, supervisor of mathematics. The bulletin contains a report of a state-wide survey in arithmetic made in April, 1926. The tests included computation, problem solving, and problem analysis. The results show that the achievement for the entire state is high in comparison with the standards of the country as a whole. The differences between the achievement in the village schools and the one-teacher schools are slight though the one-teachers schools are almost uniformly lower than the other. The bulletin also contains the results of a questionnaire on "The Teaching of Arithmetic." Teaching load, time distribution, and subject-matter are each considered.

The New Hampshire State Board of Education Circular containing the 1925-26 secondary reports came to our desk a short time ago. It presents detailed statistical data on the secondary schools of that state, but certain items in the report are of more than local interest. For example, the total secondary-school enrollment is given as 18,125, and the total number of graduates in 1926 is 2,461. Attention must be called to the fact, however, that the total enrollment includes a large number of junior high schools having a one- and two-year program. A later table shows that the graduates were 55.1 per cent of the number in the class when it was enrolled in Grade IX. This figure is slightly above the average for the past ten years, although the figure has been excelled on three other occasions. Another interesting item in the circular is the ranking of the schools according to the quality of work done by the graduates who entered higher institutions.

Silver, Burdett, and Company has published a handbook, *Better Teaching*, for teachers and supervisors. It is the work of Dr. Frank L. Clapp and Thomas M. Risk, of the University of Wisconsin, in cooperation with certain school men of that state, and G. S. Willey, director of the State Junior College, Trinidad, Colorado. The content of the booklet may be inferred from the table of contents, the major divisions of which are as follows: Part I takes up "Teaching Activity" under which instruction for knowledge, drill, and instruction for appreciation and inspiration are discussed. Under "Factors That Make Teaching Activity Successful," the heading of Part II, personal characteristics, social and professional characteristics, and school management are

considered. An examination of the pamphlet is necessary, however, to see how skillfully the authors have arranged practical material under these various headings. A teaching-improvement card and a bibliography complete the bulletin.

Principal Neil D. Mathews, of West Commerce High School, Cleveland, has sent in the schedule of the faculty meetings for the year. Each meeting is to be arranged by a committee of teachers, having from one to five members; and every teacher has been assigned work on one of these committees. The list of topics for the year is:

October 13—
"The Value of a School Placement Bureau in Guidance and Curriculum Revision," Mr. Jones
October 27—
"A Comparison of the Success of Pupils Entering High School in February and in September," Mr. Hoover
November 17—
"The Distribution of Pupil's Study Time among the Various School Subjects," Miss Dugan, Mr. Hess, and Miss Albaugh
December 1—
"Study Helps for Pupils," Mr. McMyler, Miss Stanford, and Miss L. Smith
December 15—
"The Effects of Outside Work on the Kind and Amount of School Work Done by Pupils," Mr. Hines, Mr. Creig, and Miss Franks
January 5—
"Use of the School Library and Achievement in Various Subjects," Miss N. Jones, Miss Currin, and Mr. Hottell
January 19—
"The Activities Period in the School Day," Mr. Stokes, Miss Jackson, and Mr. Elliot
February 16—
"The Relation of Problem Learning Rates to Favorite Subjects and Occupational Choices," Mr. Aseltine, Miss Snyder, and Mr. Gephart
March 2—
"A Comparison of Problem Learning Rates and Achievement in Various Subjects," Mr. B. Smith, Mr. Curry, and Miss Foster
March 16—
"A Comparison of Achievement in English and Other School Subjects of Pupils from English Speaking and Non-English Speaking Homes," Miss Ward, Mr. Shuman, and Miss Colvin
March 30—
"The Effect of High-School Training on the Voluntary Reading of Pupils," Miss Grant, Miss Winters, Miss Triester, and Mr. Hartzell
April 20—
"An Analysis of the Holding Power of Cleveland Senior High Schools," Mr. Hinkey, Mr. Harsh, and Miss Gombert
May 4—
"The Relation of Pupil Health to Learning," Miss Schroeder, Miss Krumhar, Mr. Bailey, and Mr. Dutton
May 18—
"A Self-Rating Scale for West Commerce Teachers," Miss Reames, Miss Brewer, Mr. Rayman, Miss Fredericksen, Miss Cutright
June 1—
"Summary of the Accomplishments of West Commerce during 1926-27 with Suggestions for Improvement Next Year," Miss Ely, Mr. Benadum, Miss Hazelton, and Mr. Gordon

The following is a bit of English written in the kind of spelling our advertising experts are teaching our children. Shall we just smile or raise a howl about it?

KLASSY, NUE BIZNIZ ETIKET

BI BILL DING

The fyte is on. Kum quik, dubl kwick, kant yu? Nu lif is kneeded. The ruff redd kotes and tuff yello koats of jiant munkee bizniz ar kutting strate into the middl ov our gud skules.

The tru blu cotes an fre wite coats, an all wel maide, hy grade an skilful peepul shud kare this tyme and be redi to flo to our kompany's kamp. It wil not bee ezy to loc tite the dynamyte of nu freedom an keep it fyr pruf an phool pruf where nun but gud hi skore fokes may pla the rol of lif. We seldom nock those who x-cel in bizniz lif and pla the kards to perfexion. They seem to hol the lok and kee to the merre korners of our nufashoned and vodvil type lif. One fyne poynt is this; we boyes shud nevr trubl peepul for luxuries such as chocolait kake, creme pi, bokays, klassy, nu and neet-phit suits an yello shus befor we enlist as fyters in this cause; but we kan bee redy to eet taystee holsum ry bread evry dey, luk to the rite, sta klene, bak the dri fyte, an giv servis—kwick and royale servus to our yung fokes thru aid to skules. The penn is myty. Servis onli, kan giv shur pruf an typify mens standards of lif. We kneed to hav klere, kool, strate an kompleat thinking and timely acting in this matter of glaring signs and bold advertisements that purposefully misspell our common words.

Wy duz bizniz, wich nit an da from koast to rainbo fyres so much lectric, even electrick energee an heeted litening at our skules for not turning out exzact spellers, set such a poor example of that which they are demanding of our schools? They ar poor rayflectors of wat they kneed. You no lif an fax. Is it to bee klever, to sho foreign kolor, or onli to bee kute? "Damfino." Do you?

R. M. WASHBURN

St. Paul, Minnesota

SOCIAL EQUIPMENT OF THE HIGH-SCHOOL STUDENT

While all educators agree that intellectual development should receive the greatest emphasis in the secondary-school curriculum, the modern educator has recognized that mental training is not sufficient to produce the harmoniously developed student who is not only trained of mind, but is virile of body and beautiful of soul. Extra-curricular activities are being emphasized at present as a means of securing physical and social development. Private preparatory schools have for a long time given extra-curricular activities and deportment prominent places in their courses of study.

Modern life is many-faceted and the employer of today demands more than intellectual development from high-school graduates. Social qualities are considered major qualifications in all fields. In the December number of the JOURNAL OF EDUCATIONAL RESEARCH, social qualities were placed first in importance in the selection of teachers.[1] The article defined social equipment in the teaching profession as including all those qualities which seem to contribute

[1] Dozier, Miriam. "Confidential Recommendations as a Basis for Selecting Teachers," *Journal of Educational Research*, 14: 325-35, December, 1926.

to success in dealing with pupils, patrons, official superiors, and co-workers. Business employers are constantly asking for office employees who have personality and the ability to meet people. That indefinable characteristic called "personality" is one of the most vital forces in the world. Civilization requires many social contacts today, many of short duration but of great importance in which social qualities are the determining factor.

Extra-curricular activities have made it possible for us to develop physical, moral, and social qualities in our high schools. Social functions of school clubs provide opportunities to inculcate social ideals, to practice graceful hospitality, and to develop resources in entertaining others. It is possible to create so many situations that will encourage pupil participation in activities that tend to develop social traits. Club meetings are the occasion for development of self-control while another is speaking, poise while presiding or speaking from the floor, graciousness of manner in presenting views, courtesy toward one another. The teas given by the Girls' League allow scope for planning for the entertainment and refreshment of guests, to develop poise and ease of manner in receiving and serving guests, and a sense of responsibility for the success of the affair.

Suppers of the Boys' Club may be the means of inculcating table manners, the art of conversation, and general deportment if the right atmosphere is created. Father-Son banquets and Mother-Daughter teas provide natural means of training in hospitality and create good spirit between the home and the school. Social functions in the school can thus be made the means of producing high-school graduates of more personal charm.

The business and social worlds of today require persons who are able to make many social contacts. Social qualities are a requisite of all educated persons and the opportunities to develop social equipment should be recognized in secondary schools.

JANE A. DARGAN

Bulkeley High School, Hartford, Connecticut

COMPARISON OF THE SCORES ON PINTNER-CUNNINGHAM TEST AT THE BEGINNING OF THE KINGERGARTEN COURSE IN THE SECOND GRADE

In the schools of Newton, Iowa, the Pintner-Cunningham Intelligence Tests have been used to test the kindergarten children during the first weeks of their school life. Owing to the amount of work involved in carrying out the testing program in our small city, individual Binet tests can be given only to those especially in need of retesting. Last year the group test was the only measure of intelligence for the greater portion of the kindergarten children. Many kindergarten and primary teachers criticized the validity of the scores which had been secured from kindergarten children before they had had any school experience. The teachers believed such scores would be more valid if the test were given at the end of the kindergarten period or at the end of the first grade.

The problem that had to be answered was: Are the scores secured on the Pintner-Cunningham test at the time of a child's entry into school less reliable than the scores secured later? The procedure used in answering this question was: (1) In our second grades there were 73 children for whom we had a score on the Pintner-Cunningham test which had been given them the first week they went to the kindergarten. The Pintner-Cunningham test was again given to these children after they had completed ten weeks of work in Grade II-B. (2) The Stanford Revision of the Binet-Simon Scale was given individually to these same 73 pupils during the second grade.

The correlation between the first Pintner-Cunningham test and the individual Binet was computed by the Pearson method. The correlation between the second Pintner-Cunningham test and the Binet test was worked out in a similar manner. If the first correlation was materially less than the second correlation, we should feel that the results secured by this early use of the group test were so much less reliable than those secured by it from the children as they became more mature as to warrant some change in our testing program. The correlation between the Binet test and the first Pintner-Cunningham was + 0.72; that between the Binet test and the second-grade Pintner-Cunningham was + 0.79.

There is not enough difference here to make any examiner feel that the results secured by the Pintner-Cunningham test given at the entry of the child to school will be materially altered by a later test or that it is any more unreliable than any good group test.

B. C. BERG
Superintendent of Schools
ETTA PARKS
Department of Tests and Measurements
Newton, Iowa

The following is quoted from a newspaper clipping sent me recently with the suggestion that it be printed under the heading, "Lame Duck Bites Ballou."

One of the most turbulent clashes occurred over the section of the bill appropriating $5,662,000 for teachers' salaries in the District [of Columbia] schools, which Representative Fred Zihlman, of Maryland, chairman of the District of Columbia, desired to see increased. Representative Funk opposed an increase in no uncertain terms.

"We all know what school men are. They are faddists. Take the situation in your own home town, or in the home town of any member and ask that member, and on inquiry they will tell you that 90 percent of the schools of their towns are run by faddists, men and women attached to some peculiar 'ism.' And that is the situation in Washington. They have gone crazy as to the amount of money they want to spend on these schools!"

Representative Funk was defeated for reelection to Congress last autumn but as late as February was able to interfere with educational progress in the city of Washington.

REVIEWS

VAN WAGENEN, M. J. *Educational Diagnosis and the Measurement of School Achievement.* New York, Macmillan Company, 1926. viii + 276 pp.

For those school people who are not thoroughly trained in statistical methods of test interpretation this book should serve as a valuable manual, for it is technically sound and reliable. The explanations are detailed and simple; but, because it is so detailed, it is uninteresting reading.

The methods of interpretation were worked out by the author to use in studying the achievement of pupils in school systems of widely varying sizes. The treatment therefore shows appreciation of a wide variety of problems. The main thesis is to describe methods of using the results of tests so as to show the actual conditions existing in a school or school system. This leads to a consideration of the means of obtaining more complete information about pupils, the peculiarities of teaching emphasis, the various methods of classification, and the need of supervision. A special technique, using blanks prepared by the author, makes these analyses possible.

One characteristic of the book should be mentioned which may be considered both a valuable contribution and a shortcoming. The author brings one face to face with issues and then stops. He gives no adequate suggestions for meeting the situations which the tests reveal. One is left with the feeling that things are not as they should be and that the direction of the needed change is clear, but what to do is uncertain. Some of the unsolved difficulties are: What are the principles which should guide us in grouping children? How should a teacher distribute her effort? Must she stress all subjects equally or, if she has particular facility in one or two, should she capitalize her own interests and ability? Which is better for the children? The author makes no attempt to answer these questions, but his analysis makes us conscious of them.

W. W. COXE

The University of the State of New York

WILLING, MATTHEW H. *Valid Diagnosis in High School Composition.* New York, Teachers College, Columbia University, 1926. viii + 64. (Teachers College, Columbia University, Contributions to Education, No. 230)

Even the most zealous exponents of diagnostic teaching in English composition quail at the thought of the sheer labor and time involved in the best techniques now at their command. Such teachers will welcome Dr. Willing's attempt to find or derive a more efficient method.

In the light of his earlier researches and in the face of expressions of smug confidence by his contemporaries, Willing was skeptical of the diagnostic value of pupils' compositions. He suspected that a more economical and valid and, therefore, reliable means of analyzing pupils' needs in composition might be found. His primary problem was to determine the comparative validity of two procedures for diagnosing individual pupils' weaknesses in the formal aspects of written composition. The two procedures which he selected were the error-analysis of typical schoolroom themes and the error-analysis of performance in typical proofreading and error-recognition tests.

From each of 70 eighth- and ninth-grade pupils, Willing secured eight themes on varied assignments and sixteen formal tests of varied kind, complexity, and comprehensiveness. To permit comparisons with the scores of objective tests, each theme was scored upon an improvised error-guide consisting of 340 errors. The scores on the tests were correlated with each other, with intelligence, and with composition as measured by the error-guide. Using this guide as a criterion, he also determined the comparative reliabilities of various combinations of devices.

While Willing's conclusions are too significant and too much interrelated to be safely summarized, in general, it may be said that while his error-record is reasonably useful for hunting down the most frequently made kinds of errors, it is an impractical means of searching out the infrequent sorts of weaknesses. The objective tests proved to be poor indicators of the specific kinds of error which individual pupils made in their writing. Themes merely revealed the general weaknesses of the pupil's writing and a specific test exposed errors in that specific quality. Intelligence showed a somewhat higher relation to specific abilities than to general proficiency in writing.

Willing makes no exaggerated claims for his study. He readily admits the subjective nature of his criterion, and he points out the limitations of his researches. He only claims to have shown that the techniques which he investigated are unsatisfactory. This is a real contribution, for the elimination of ineffective methods inevitably hastens the discovery of the best.

EARL HUDELSON

University of Minnesota

GANDERS, H. S. *A System of School Records and Reports for Smaller Cities.* Greeley, Colorado, Colorado State Teachers College, 1926. vii + 191 pp. (Colorado Teachers College Education Series, No. 1)

This study is a material contribution to the solution of one of the biggest problems in school-accounting, namely, that of determining those items which should be recorded and reported in a school-accounting system. The records, reports, and communications of fifteen cities of from five thousand to fifteen thousand population were studied by personal visitation. These systems, it was found, lacked not only uniform practices in recording and reporting, but also permanence, cumulative features, simplicity, accuracy, and promptness in making reports. In some cities, entire phases of school-accounting were omitted.

The accounting systems of these cities contained a total of 1,409 separate items. After submitting these items to a rigid regimen of analysis and evaluation by 276 experienced school men, Mr. Ganders with infinite care places a definite valuation upon the 1,358 items of his "Significant List."

He then names the *elements* which should appear in a school-accounting system for cities of from five thousand to fifteen thousand and incorporates in this proposed system the ranked *items* of his significant list. The proposed system contains 85 different elements which is 162 fewer than were found in the fifteen cities studied. The standards used in selecting the elements were: utility, unity, simplicity, completeness, continuity and cumulative features, permanence, uniformity, flexibility, optimum timeliness, efficiency of organization, correct form and accuracy of entries, correct form and construction of elements, and correct filing provisions. Each element is named and described in detail, its specification are given, its routing is stated, and the items which might appear upon it are listed with their ratings.

The book is a mine of information. The wealth of detail which has been compressed within pages 72 to 172 will doubtless overwhelm the novice. Each page is filled with phrases representing items, with percentages and percentile ranks showing the value of each item, with code numbers, cross-reference notations, specifications, and suggestions for the routing of each element. The student of school-accounting will find the volume an exceedingly valuable handbook.

A. O. Heck

Ohio State University

Barr, A. S., and Burton, W. H. *The Supervision of Instruction.* New York, D. Appleton and Company, 1926. xiv + 626 pp.

We are told in the Preface of this book that it is "in no sense a revision or a re-writing" of Burton's *Supervision and the Improvement of Instruction.* Most readers will probably agree, however, that it is essentially a revision of, and an improvement upon, the earlier work. It retains the practical character of the earlier book. A distinctive feature is its survey of existing literature and practice. In this respect, it is probably the most helpful and practical book thus far published in the field of supervision. Most books on supervision attempt to divide their interests between problems peculiar to teacher-training departments and those encountered by supervisors in the public-school system. They fail to assist the latter as they might because they do not sense the unique character of their difficulties. The outstanding virtue in the book under review is its description of ways in which supervisors under widely different conditions are actually solving their problems; it is literally a manual of contemporary practice.

The comprehensive character of the discussion is evident from a survey of the book's contents. It contains fifteen chapters, the first four of which are devoted to a survey of the general field of supervision, the principles which

should shape supervisory practice, and the organization and planning of supervision. Then follow eight chapters devoted to a detailed study of the practice of supervision. The major headings are: "Studying the Work of the Teacher," "The Improvement of Teaching through Visitation and Conference," "The Improvement of Teaching through Better Selection and Organization of Subject-Matter," "The Selection and Standardization of the Materials of Instruction," "The Use of Educational Tests and Measurements in the Improvement of Teaching," "The Improvement of Teaching through Research and Experimentation," "General Devices for the Improvement of Teachers in Service," and "Evaluating the Efficiency of Teachers." Finally, in three concluding chapters, the authors hold the mirror up before supervision, treating of ways of evaluating supervision, the training and personality of supervisors, and the scientific study of supervision.

V. T. THAYER

Ohio State University

STEELE, ROBERT MCCURDY. *A Study of Teacher Training in Vermont.* New York, Teachers College, Columbia University, 1926. ix + 111 pp. (Teachers College, Columbia University, Contributions to Education, No. 243)

Teacher-training problems press for solution in each state. No state has yet succeeded in solving the twofold problem of recruiting a sufficient number of the right kind of young people for the profession and of providing adequate training facilities for this number. Students of the subject have known for years that Vermont's position is unenviable. She has lagged behind neighboring states in the development of a teacher-training program.

Doctor Steele's dissertation portrays the Vermont situation in a vivid manner. It is shown that, as a result of politics and the practice of false economy by a series of legislatures, training facilities for teachers are woefully inadequate in this state. Conditions are described in detail and a constructive program is outlined. This program calls for the abolition of the teacher-training classes in high schools and academies and for the establishment of a central state teachers' college at Burlington. Since the state needs annually only about one hundred and fifty high-school teachers and three hundred and twenty-five rural teachers, these could be provided by one training institution. A minimum standard of four years of collegiate preparation for secondary teachers and two years for elementary teachers is recommended.

Since various commissions in the state had already wrestled with the teacher-training problems and had made recommendations coincident in part with those contained in Doctor Steele's study, and since the report entitled, *A Study in Education in Vermont*, published by the Carnegie Foundation in 1914, dealt rather fully with the question of teacher training, the book under review is not a contribution in the sense that it might have been, had some state other than Vermont been the subject of investigation. This fact of overlapping other published reports and the fact that the book contains a great many statistical errors detract in no small degree from its value. If the effect of the

study is to stimulate the development of Vermont's teacher-training facilities, however, perhaps we can forget the author's very evident shortcomings in arithmetic.

R. L. MORTON

Ohio University

NOONAN, MARGARET E. *Influence of the Summer Vacation on the Abilities of Fifth and Sixth Grade Children.* New York, Teachers College, Columbia University, 1926. vi + 103 pp. (Teachers College, Columbia University, Contributions to Education, No. 204)

"Review last year's work before starting any new work," has been the counsel of superintendents and the practice of teachers for many generations. The practice has become so general and has been in effect so long that it has become almost a tradition with educators. A venturesome few have occasionally called the practice into question, and several experiments have been conducted to determine the influence of the summer vacation on the skills which the child had developed in school.

One of the most carefully conducted of these experiments is that carried on by Miss Noonan, and recently printed as one of the "Teachers College Contributions to Education." Like most doctors' dissertations, the report fairly bristles with comparative tables, and the treatment of the tabular facts is likely to be uninteresting to any but those who are working directly with this type of material.

The conclusions, abundantly supported by the facts, are that for fifth and sixth grades the summer vacation does not cause any significant changes in such school abilities as the ability to compute, to spell, to read, to solve problems in arithmetic, and to draw. Current opinion has greatly exaggerated the deterioration that takes place. Thus is another of our educational icons shattered.

JOSEPH A. BAER

Ohio State University

PRYOR, HUGH CLARK. *Graded Units in Student-Teaching.* New York, Teachers College, Columbia University, 1926. viii + 114 pp. (Teachers College, Columbia University, Contributions to Education, No. 202)

This monograph is a cumulative study based on opinion and actual experience in developing a series of units for use in supervised student-teaching. A preliminary list of units was ranked in order of gradation by supervisors of student-teaching. Help was also received from student-teachers, critics, a few elementary-school principals, the members of a department of rural education, and the students in a training class for high-school teachers. The resulting series of items is to constitute a basic group of student-teaching activities for the preparation of elementary teachers. One section is devoted to the desirable administration of the units, and the final section deals with the limitations and advantages of graded participation. Only three of the units—Nos. I, X, and XVIII—are published entire.

The author readily defends his series. The section on "Limitations and Advantages" rather belies its title, for it is largely a statement of advantages believed to inhere in the system. The book is the first comprehensive attempt to bring into reality a conception before rarely used. In devising and using ways to determine the serial order of gradation, in emphasizing the great necessity for appropriate administrative conditions to enable the realization of such plans, in the series themselves as a group of activities for further use and experimentation, the author has made distinct contributions to educational literature.

The study falls short of the demands of scientific accuracy and fitness in the following respect: (1) in evolving a method and criterion which would be free from error to use in developing the series; (2) in producing a series which is not likely to prove to be an actual graded series in terms of difficulty; and (3) in insisting on beginning the series with the routine features. This last item, at least, is open to question. Teacher-training institutions will find in this book a distinct help for a scheme of work based on the beginnings of a philosophy of teacher preparation, but the philosophy is yet lacking in many respects.

A. R. MEAD

Ohio Wesleyan University

HELSETH, INGA OLLA. *Children's Thinking.* A Study of the Thinking Done by a Group of Grade Children When Encouraged to Ask Questions about United States History. New York, Teachers College, Columbia University, 1926. v + 163 pp. (Teachers College, Columbia University, Contributions to Education, No. 209)

Those who believe in the importance of developing in children the power to think will be grateful to Dr. Helseth for a demonstration of one way in which this end was accomplished. Sixteen pupils of average intelligence in a class in United States history—eight seventh-grade and eight eighth-grade pupils—were allowed to ask and discuss any question of interest to them that pertained to their subject and to use any method of studying or reciting which appealed to them. The only restrictions set were that they made good use of their time and carried to fair completion any problem upon which they embarked. A stenographic report of the classroom discussion was kept throughout the year, and this report, together with a careful analysis of it, forms the bulk of this monograph.

It need hardly be said that in the beginning the pupils were hard put to it to find questions worth considering. Progress in this respect is the first item to note. From questions on isolated facts, calling for one-word answers, they passed to more comprehensive ones calling for the organization of a wide range of facts. From regarding questions as something asked by the teacher on the day's lesson, they came to see them as problems which confronted the men of the time.

Along with this progress in asking questions, went progress in answering them and in formulating conclusions. They learned how to use different sorts

of printed material, how to analyze and synthesize, how to establish the trustworthiness of facts.

Beginning without even the habit of listing related items, they come to make good sentence outlines of chapters read, of talks heard, of reports offered in class, of class discussions, and of reviews covering long ranges of time and material. By May, the class managed for itself as a matter of course the processes of seeing relationship and formally organizing results (p. 75).

Perhaps more important than obtaining results is the fact that the pupils were aware of how they obtained them. Being free to adopt any method they chose, it was natural that, whenever the chosen method failed to bring the desired result, it was examined and modified or perhaps rejected. When at the end of the year they gathered together their bits of methodology, they had an array of items which would do credit to many a class of college Freshmen of twice their number. In spite of the unconventional procedure and the attention given to method, they mastered the content as well and, judged by the results of standard tests, exceeded the norms for their grades. The moral seems to be, seek ye first the development of thinking and all things demanded by the supervisor shall be added unto you; and more too, it looks as though these pupils actually acquired some of the outcomes—habits, skills, attitudes—which teachers of history claim for their subject.

EDWIN W. PAHLOW

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OSBURN, W. J. *Are We Making Good at Teaching History?* Bloomington, Illinois, Public School Publishing Company, 1926. 130 pp.

This book summarizes the results of a study made by Mr. Osburn for the Wisconsin State Department of Public Instruction under a grant from the Commonwealth Fund. Two problems were set for investigation, What do teachers expect their pupils to know at the completion of a course in history? and How is this knowledge related to the recognized objectives of history teaching? The investigation is based upon the study of over fifty-six thousand questions asked on 2,250 examination papers from 1,125 schools representing every state in the Union. Four well-recognized units of history, elementary American, secondary American, ancient, medieval and modern, are selected for measurement.

The extent of the survey is adequate for its purpose, the method of analysis is both sound and searching, proper safeguards against error are applied, and the conclusions drawn are moderately stated. As far as the content and objectives of these history courses can be judged by examination papers, the conclusions stated would seem to be incontrovertible. Both questions raised are fairly answered and both are answered unfavorably.

The History Inquiry of a few years ago revealed such a startling lack of uniformity in the courses offered that the title, "Confusion of Tongues," was applied to the conditions which prevailed. This study reveals a much more serious lack of agreement in the content of courses known by the same names.

Another discouraging sidelight thrown by this study is the non-progressive character of the content of history courses. As an example in secondary American history, Colonial Development, Exploration, and Presidential Administrations rank second, third, and fourth in a list of topics showing relative emphasis; while Recent History is twenty-fifth. Indeed, some of the by-products are most illuminating.

The book is valuable as a measurement of present conditions. It contains many little guideposts toward better things. It is worthy the careful study not only of supervisors and administrators but also of history teachers. To the reviewer it seems that it might have been made more useful by an expansion of the conclusions reached in each chapter and especially by a fuller statement of "Practical Values," given on page 68.

EDWARD P. SMITH

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WAGENHORST, LEWIS HOCH. ***The Administration and Cost of High-School Interscholastic Athletics.*** New York, Teachers College, Columbia University, 1926. x + 134 pp. (Teachers College, Columbia University, Contributions to Education, No. 205)

This is the first book dealing with the organization and administration of high-school athletics which has been published in this country. It is the result of a thorough investigation of the conditions existing today in the control and supervision of state high-school athletics. The study reveals the influences and agencies that have contributed to the promotion and development of high-school athletics.

Part I is devoted to a brief sketch of the historical background underlying the first attempts made by the various states definitely to control and supervise high-school athletics. As is well stated at the outset, the control of high-school athletics has been forced upon school administrators through the pressure of conditions that were leading to professionalism, rowdyism, and dishonesty in the schools. Athletics, instead of being a wholesome educational influence, was fast becoming a demoralizing and devastating influence in the life of high schools. Gradually, in most of our states, a system of adult educational leadership is being linked with pupil control and management and is showing that this common interest can serve wholesome educational aims in the school life.

Part II is devoted to a study of the various types of administration carried out in the states. This section discusses (1) the extent to which facilities are being provided by boards of education for carrying on interscholastic athletics and physical-education activities, (2) the determination of the educational qualifications, salaries, and other factors affecting the tenure of coaches, (3) the determination of the cost of the physical-education program as compared with the cost of the interscholastic athletic activities, (4) the determination of sources of revenue and methods of handling money. The information has been gathered from some 366 high schools located in twenty-eight states. At the

end of each chapter is a brief summary with conclusions and recommendations based on the findings. Recommendations have been made which, if incorporated in our schools, will go a long way toward placing interscholastic athletics upon a more wholesome educational plane.

The book is worthy of careful study by all administrators of secondary schools as well as those who are in the field of physical education and athletics. Superintendents and principals will find many helpful suggestions which will be useful in solving the vexing problems of interscholastic sports.

J. H. NICHOLS

Ohio State University

LA SALLE, DOROTHY. *Play Activities for Elementary Schools.* New York, A. S. Barnes and Company, 1926. ix + 177 pp.

The author of this recent addition to the literature of physical education, assumes a number of important philosophical principles. Plays and games are conceived as a part of the program of health education, but no effort appears to have been made to evaluate specific games or specific types of play in terms of health education. The author appears simply to assume that all of the activities are valuable. The opportunity to teach good sportsmanship in athletics is vigorously stressed. The importance of thinking of sportsmanship in terms of concrete activities on the part of players, spectators, and teachers is emphasized in the description of a considerable number of activities that are characteristic of good sportsmen.

Nearly all the activities described are in accord with the third assumption, that free play is more valuable than formal gymnastic drills. A fourth assumption is that the school program of physical education should emphasize the games that people can play in adult life, although few of the games that adults actually do play, are included in the book. The author also assumes that as children gain experience they should gain larger powers of self-direction in play, and valuable suggestions are given with this object in view. The last principle emphasized is that all pupils, boys and girls alike, should be included in the play program. The materials listed are admirably selected with this purpose in view.

The book is primarily a practical manual for teachers of physical education, but it unfortunately exhibits a number of faults which limit its usefulness. Large sections of it appear to be wholesale reproductions of the manual of physical education of Detroit. The reviewer was unable to discover any suggestions in the text to the effect that the material is largely that which is used in Detroit and that the reader must make what adaptations of it he can to his own needs. A considerable number of books is listed in the bibliography, but no specific references to pages or chapters are provided, although it is obvious that some of the chapters in many of the books have practically no relation to the author's subject. Several sections of the book, such as "Gymnasium Activities" and "Competitive Athletics," have been inserted without

sufficient introductory and transitional material to set forth their significance in a well-ordered program of physical education.

Despite these limitations, teachers can find much useful information concerning a varied range of games and competitive athletics, practical methods of administration, and some of the most important objectives of physical education in the elementary school.

PAUL W. TERRY

University of North Carolina

BUCHHOLZ, H. E. *U. S.: A Second Study in Democracy.* Baltimore, Warwick and York, 1926. ix + 400 pp.

This volume is the writer's confession to the conviction that "the present situation (in government) demands that somebody should review the trails already traveled by the American republic, take stock of the present, and make plans for the future." He tells the story of Thomas Clapham, a grocer, who had four children, two boys and two girls. He took care of their needs, even after they married and had their own households, with the result that the financial strain was too great and Thomas became a bankrupt. The parallel is that the United States government is assuming too much control over its citizens and it too may break down.

The political "boss" and machine-made statesmen are discussed, along with the merits of "a business administration." Then follows a discussion of the correct governmental attitude toward the moral acts of the people, freedom of the people, a more perfect union, justice, domestic tranquillity, the common defense, the general welfare, and the blessings of liberty. In his own words, the writer "reports a growing tendency to autocratize political administration," and points out that this tendency, if unarrested, must eventually destroy all traces of democracy. He finds no ground on which to rest the hope that either commercial politicians or machine-made statesmen can ever be eliminated from politics; and he frankly acknowledges that their influence on political administration, unless new ways for controlling it are found, will be hazardous to constitutional government. He discards the suggestion that constitution or laws or ballots, separately or together, are adequate for the creation and maintenance of a democracy. He asserts that no basis exists for the belief that things will be improved simply by attempting to put larger men into public office, and intimates that the really big man of private life invariably becomes a conventionally small man in public service.

As a remedy for existing conditions, he suggests the development of "public-opiners," public spirited, private citizens, who should be thought of "as the yeast that is to leaven the latent forces of public opinion."

PETER RITZMAN

PUBLICATIONS RECEIVED, JANUARY 15 TO FEBRUARY 15

BOOKS FOR EDUCATIONAL EXECUTIVES

Educational yearbook of the International institute of teachers college, Columbia university, 1925. Ed. by I. L. Kandel. New York, Macmillan, 1926. 583 pp. $3.50.

Engelhardt, N. L., and others. *Standards for public school janitorial-engineering service.* New York, Teachers College, Columbia Univ., 1926. 53 pp. $.75.

Hart, F. W., and Peterson, L. H. *A survey of the educational program, organization and administration, school finances and schoolhousing of Vallejo, California.* Vallejo, Calif., Board of Education, 1926. 110 pp. $1.00.

Hart, J. K. *Adult education.* New York, Crowell, 1927. 341 pp. $2.75.

Moehlman, A. B. *Public school finance.* Chicago, Rand McNally, 1927. 508 pp.

National Society of College Teachers of Education. *Studies in education.* Chicago, Univ. of Chicago Press, 1927. 205 pp. (Yearbook, no. 15) $1.00.

Neumann, G. B. *A study of international attitudes of high school students with special reference to those nearing completion of their high school courses.* New York, Teachers College, Columbia Univ., 1926. 120 pp. (Contributions to education, no. 239) Cloth, $1.50. Paper, $1.25.

Fink, M. A. *Procrustes or the future of English education.* New York, Dutton, 1927. 108 pp. $1.00.

Rufi, John. *The small high school.* New York, Teachers College, Columbia Univ., 1926. 145 pp. (Contributions to education, no. 236) Cloth, $1.50. Paper, $1.25.

Schwartz, H. M. *Improvement in the maintenance of public school buildings.* New York, Teachers College, Columbia Univ., 1926. 74 pp. (Contributions to education, no. 240) Cloth, $1.50. Paper, $1.25.

BOOKS FOR PSYCHOLOGISTS

Slawson, John. *The delinquent boy.* Boston, Badger, 1926. 477 pp. $5.00.

BOOKS FOR TEACHERS AND SUPERVISORS

Brubacher, A. R. *Teaching: profession and practice.* New York, Century, 1927. 301 pp. $2.00.

Butterweck, J. S. *The problem of teaching high school pupils how to study.* New York, Teachers College, Columbia Univ., 1926. 116 pp. (Contributions to education, no. 237) Cloth, $1.50. Paper, $1.25.

Effinger-Raymond, Frances, and Adams, E. S. *Standards in elementary shorthand.* New York, Gregg, 1926. 115 pp. $.60.

Holley, C. E. *The practical teacher; a handbook of teaching devices.* New York, Century, 1927. 306 pp. $2.00.

Mathews, C. O. *The grade placement of curriculum materials in the social studies.* New York, Teachers College, Columbia Univ., 1926. 152 pp. (Contributions to education, no. 241) Cloth, $1.50. Paper, $1.25.

Sanford, A. H., and Gordy, W. F. *A teachers' manual accompanying the Sanford-Gordy American history maps with European background and beginnings.* Chicago, Nystrom, 1926. 122 pp. $.70.

Scham, Max, and Scham, Grete. *The tired child.* Philadelphia, Lippincott, 1926. 342 pp. $2.00.

Stroh, M. M. *Literature for grades VII, VIII, and IX.* New York, Teachers College, Columbia Univ., 1926. 110 pp. (Contributions to education, no. 232) Cloth, $1.50. Paper, $1.25.

West, Michael. *Bilingualism with special reference to Bengal.* Calcutta, Govt. of India Central Pub. Branch, 1926. 354 pp. (India. Bureau of Education. Occasional reports, no. 13) 4*s.*

BOOKS FOR HIGH-SCHOOL STUDENTS

Buchanan, H. E., and Sperry, Pauline. *Plane trigonometry.* Richmond, Va., Johnson Pub. Co., 1926. 112 pp. $1.64.

Hammond, H. E. *A laboratory manual of elementary college physics.* Columbia, Mo., Lucas Bros., 1926. 129 pp. $1.25.

Martínez Sierra, Gregorio. *Sueño de una noche de agosto.* New York, Holt, 1926. 171 pp. $1.00.

Maupassant, Guy de. *Cinq contes.* Ed. by J. B. Patterson. New York, Oxford Univ. Press, 1926. 95 pp. $.45.

Roehm, A. I., and Manchester, P. T. *Laboratory exercises for the Warshaw-Bonilla elements of Spanish.* Chicago, Scott, Foresman, 1926. 91 pp. $.60.

Sachsse, D. K. *Modern exercises in German.* New York, Globe, 1926. 57 pp. $.60.

Schorling, Raleigh, and others. *Instructional tests in algebra.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1927. 72 pp. $.28.

Simpson, E. L. *Five easy French plays.* Boston, Ginn, 1926. 172 pp. $.80.

BOOKS FOR JUNIOR HIGH-SCHOOL STUDENTS

Condon, R. J. ed. *The Atlantic readers.* Boston, Little, Brown, 1927. Book 4, The great conquest. 337 pp. $.85.

Ruch, G. M., and others. *Arithmetic work-book.* Chicago, Scott, Foresman, 1926. Grade 7, teacher's ed. 74 pp. $.48. Grade 8. 76 pp. $.36.

Spaulding, F. E., and others. *Aldine third language book.* New York, Newson, 1926. Teachers' ed. 432 pp. $1.04.

BOOKS FOR ELEMENTARY-SCHOOL STUDENTS

Coulomb, C. A., and others. *What Europe gave to America.* New York, Scribner, 1927. 378 pp. $1.20.

Hofer, M. R. *Festival and civic plays from Greek and Roman tales.* Chicago, Beckley-Cardy, 1926. 237 pp. $1.25.

Hubbard, Eleanore. *Citizenship plays; a dramatic reader for upper grades.* Chicago, Sanborn, 1922. 344 pp. $1.00.

Individual practice materials in arithmetic. New York, Lincoln School, Teachers College, Columbia Univ., 1926. Book 1. Experimental ed., rev. 140 pp.

Johnson, J. T. *Arithmetic practice exercises and tests.* Chicago, Rand McNally, 1926. Teacher's handbook. 100 pp. Student's practice book and record. Answers to the practice exercises.

Johnson, J. T. *Self-diagnostic tests in arithmetic.* Chicago, Rand McNally, 1926. Teacher's manual. 22 pp.

Lagerlöf, Selma. *Liliecrona's home.* Trans. by Anna Barwell. New York, Dutton, 1926. 269 pp. $2.00.

McMurry, F. M., and Parkins, A. E. *World geography.* New York, Macmillan, 1927. Book 2, The old world. 323 pp. $1.48.

Prahl, E. V. *Twenty songs for children.* New York, Teachers College, Columbia Univ., 1925. 51 pp.

Prout, F. J., and others. *Thought test readers.* Chicago, Univ. Pub. Co., 1926. Primer. 119 pp. $.60.

Spyri, Johanna. *Jörli; the story of a Swiss boy.* Trans. by F. T. Clayton and Olga Wunderli. Chicago, Sanborn, 1924. 111 pp. $.52.